EWM110

Basic Customizing in SAP EWM

PARTICIPANT HANDBOOK
INSTRUCTOR-LED TRAINING

Course Version: 18
Course Duration: 5 Day(s)
e-book Duration: 20 Hours 50 Minutes
Material Number: 50152621

Contents

vii Course Overview

1 Unit 1: SAP Extended Warehouse Management (SAP EWM) System Environment

2 Lesson: Outlining the Basics of SAP EWM

14 Unit 2: Integration

15 Lesson: Setting Up the Integration Between SAP ERP and SAP EWM
20 Lesson: Setting Up Delivery Document Integration

37 Unit 3: Structural Elements and Master Data

38 Lesson: Creating Structural Elements in SAP EWM
47 Lesson: Creating Storage Bins
55 Lesson: Creating Work Centers
58 Lesson: Transferring Master Data from SAP ERP to SAP EWM
65 Lesson: Creating Warehouse Product Master Data
68 Lesson: Creating Packaging Specifications

76 Unit 4: Warehouse Process Types

77 Lesson: Applying Warehouse Process Types

84 Unit 5: Goods Receipt

86 Lesson: Outlining Goods Receipt Processes in SAP EWM
90 Lesson: Setting Up Availability Groups for Inventory Management (IM)
93 Lesson: Configuring Direct Putaway
99 Lesson: Applying Putaway Rules
111 Lesson: Checking Capacities

120 Unit 6: Goods Issue

121 Lesson: Outlining the Goods Issue Process in SAP EWM
126 Lesson: Applying the Stock Removal Strategies
132 Lesson: Configuring Exception Handling
135 Lesson: Combining Items in Waves
143 Lesson: Implementing Two-Step Picking

149 Unit 7: Storage Control

150 Lesson: Outlining Storage Control
152 Lesson: Configuring Process-Oriented Storage Control
157 Lesson: Understanding Layout-Oriented Storage Control

162	**Unit 8:**	**Warehouse Order Creation**
163		Lesson: Creating Warehouse Orders
174	**Unit 9:**	**Posting Changes, Stock Transfers, and Replenishment**
175		Lesson: Performing Posting Changes and Stock Transfers
179		Lesson: Performing Ad Hoc Movements and Replenishment
186	**Unit 10:**	**Physical Inventory**
187		Lesson: Outlining the Physical Inventory Process
190		Lesson: Setting Up the Procedures for Physical Inventory
199	**Unit 11:**	**Slotting**
200		Lesson: Configuring the Slotting Process
210	**Unit 12:**	**Post Processing Framework (PPF)**
211		Lesson: Outlining the PPF
214		Lesson: Applying the PPF in Delivery Processing

Course Overview

TARGET AUDIENCE

This course is intended for the following audiences:

- Project Manager
- Project Stakeholder
- Application Consultant
- Solution Architect

UNIT 1

SAP Extended Warehouse Management (SAP EWM) System Environment

Lesson 1

Outlining the Basics of SAP EWM 2

UNIT OBJECTIVES

- Describe the basics of SAP EWM

Unit 1
Lesson 1

Outlining the Basics of SAP EWM

LESSON OVERVIEW

SAP Extended Warehouse Management (SAP EWM) can be used as decentral or embedded system, so it is important to understand the basic environment in which SAP EWM can be deployed. In this unit you also learn about the key SAP EWM functions supported by the application and the various delivery documents used to transfer data between the SAP Enterprise Resource Planning (SAP ERP) system and the SAP EWM system.

Business Example

To prepare for the implementation and configuration of the SAP EWM system in your company, as a member of the implementation team, you have been asked to research and report on the basic SAP EWM deployment options available, the major functions supported by SAP EWM, and the delivery documents your company could use to transfer data between the SAP ERP system and the SAP EWM system.

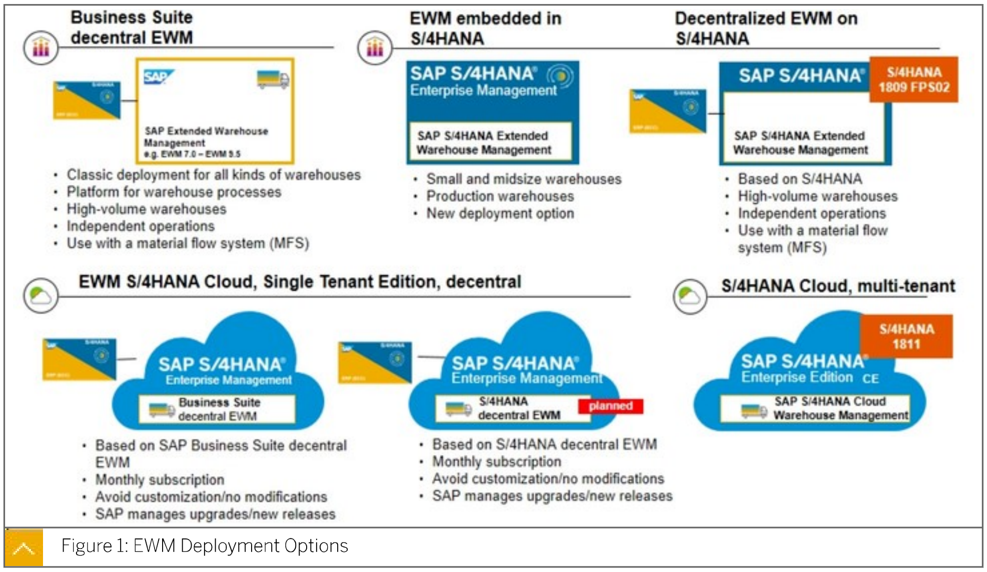
LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Describe the basics of SAP EWM

SAP ERP/SAP EWM System Landscape

SAP Extended Warehouse Management (SAP EWM) was originally designed to run as a decentralized system and based on a SAP SCM platform. With the integration in the 1610 release of SAP S/4HANA it is possible to use it as embedded EWM, which means not decentralized. With the release of SAP S/4HANA 1809 FP02, it is possible to use a SAP S/4HANA system as a decentralized EWM instance. This is the planned architecture for all future SAP EWM releases, embedded or decentralized.



Business Suite decentral EWM

- Classic deployment for all kinds of warehouses
- Platform for warehouse processes
- High-volume warehouses
- Independent operations
- Use with a material flow system (MFS)

EWM embedded in S/4HANA

- Small and midsize warehouses
- Production warehouses
- New deployment option

Decentralized EWM on S/4HANA

- Based on S/4HANA
- High-volume warehouses
- Independent operations
- Use with a material flow system (MFS)

EWM S/4HANA Cloud, Single Tenant Edition, decentral

- Based on SAP Business Suite decentral EWM
- Monthly subscription
- Avoid customization/no modifications
- SAP manages upgrades/new releases

- Based on S/4HANA decentral EWM
- Monthly subscription
- Avoid customization/no modifications
- SAP manages upgrades/new releases

S/4HANA Cloud, multi-tenant

Figure 1: EWM Deployment Options

Integration

Although SAP EWM is a self-contained application, it does require integration with a SAP ERP system as back-end to access master and transaction data. Use of certain functions or features in SAP EWM such as slotting and availability-checking may also require an interface with SAP applications and systems such as SAP Customer Relationship Management (SAP CRM), Global Available to Promise (Global ATP) in APO, and Service Parts Planning in APO.

The exception is when a warehouse is setup as Transit Warehouse. This only requires an integration to SAP Transportation Management.

Some functions that were introduced with the different SAP EWM releases, such as batch selection, kit-to-stock, and production integration, require a back-end system with a certain release or add-on. Review the SAP EWM release notes to determine the functions that require an Enhancement Pack.

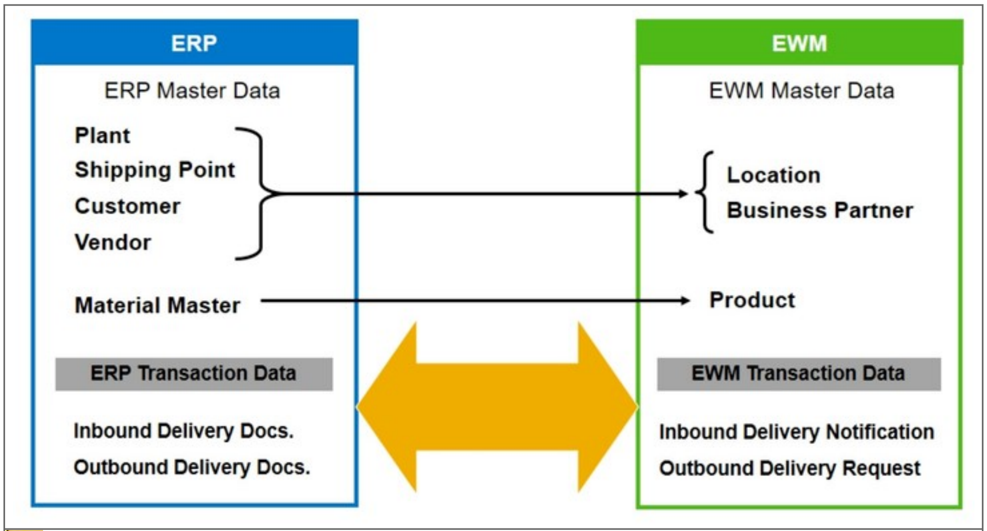


Figure 2: Data Transfer

Communication

Two kinds of data can be transferred between the SAP ERP and the SAP EWM system — master data and transactional data. In an embedded SAP EWM that is part of a SAP S/4HANA system, the transfer of master data is not required. The SAP ERP part and the SAP EWM part in SAP S/4HANA share the basic master data. For a decentralized EWM scenario, the SAP ERP system is the leading system for master data, so the data is transferred in one direction, from SAP ERP to SAP EWM. For a decentralized EWM based on SAP NetWeaver, this data is transferred using the Core Interface (CIF), the standard interface between SAP ERP and SAP SCM systems. Technically this is done by using Queued Remote Function Calls (qRFC). When using a SAP S/4HANA-based decentral EWM, the master data transfer is by using an ALE Distribution Model with IDocs for the actual SAP ERP versions.

For transactional data a separate distribution model is used. The transactional data distribution model uses qRFC.

> Note:
> Details about the data transfer between SAP ERP and SAP EWM are discussed later in this course.

SAP EWM Processes

The various SAP EWM processes are grouped into process areas as shown in the following figure:

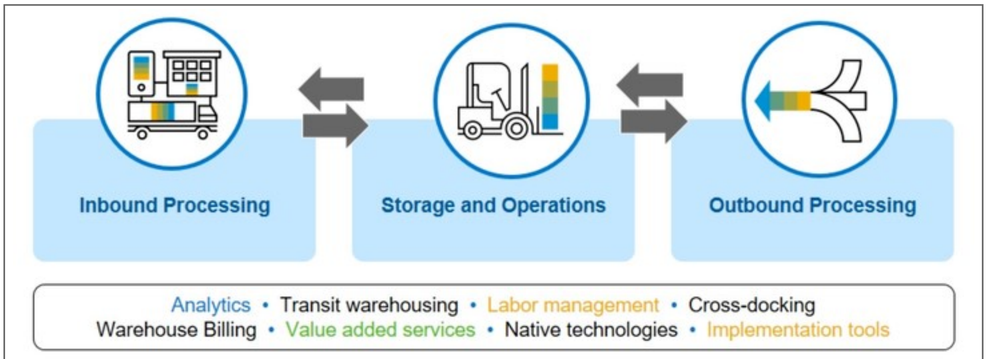

Inbound Processing
Storage and Operations
Outbound Processing
Analytics • Transit warehousing • Labor management • Cross-docking
Warehouse Billing • Value added services • Native technologies • Implementation tools

Figure 3: EWM Processes

The main process areas in SAP EWM are inbound processing, storage and operations, and outbound processing.

Inbound Processes

The following are the inbound processes:

- Transportation unit processing

  When the transportation unit arrives at the gate, a precheck is performed at the checkpoint. The transportation unit is unloaded and each pallet is checked again before being further processed.

- Goods receipt, management, and optimization

At the core of the inbound processes is the goods receipt process. This process directs the movement of products from the warehouse door to their final destination bins in the warehouse.

- Inbound quality management

  Materials received into the warehouse may require quality inspections. These inspections are managed using the quality inspection engine (QIE). Quality inspection documents are created for the products to be inspected.

- Internal routing

  Internal routing determines how products or handling units (HUs) are moved within the warehouse based on configuration settings and master data.

Storage and Operations

Storage and operations comprise the following:

- Physical inventory

  You can carry out an inventory of products and bins for stock control and balance sheet purposes. A storage-bin-specific physical inventory counts all the products and HUs in a storage bin. A product-specific physical inventory counts a specific product in one or more storage bins and/or HUs.

- Replenishment/Rearrangement

  You use replenishment control to restock a picking area depending on the demand for products in that picking area. Replenishment strategies are based on slotting or open warehouse requests. You use rearrangement processes to optimize the arrangement of your products in the warehouse by moving stock such as fast-moving items to the relevant storage bin as determined by the slotting process.

- Kit-to-stock management

  You use the kit-to-stock process to create kits and then transfer them to stock. A kit is a list of products that are always delivered together. Kit-to-stock management provides you with a simple, streamlined kit-creation process that is executed and documented in the warehouse. You can either trigger kit creation manually in the SAP ERP system based on a production order, or in the SAP EWM system directly, using a value-added service order (VAS order).

Outbound Processes

The following are the outbound processes:

- Outbound planning (route, wave, bin)

  In outbound planning, the system determines the route and bin based on the settings in customizing. You can combine or split items from warehouse requests for outbound deliveries in waves. These waves can be picked or processed at the same or different times. Waves are created manually or automatically in SAP EWM.

- Picking optimization, packing, staging, and load management

  The goods issue process represents the pick, pack, staging, and loading of products from the warehouse. Picking directs the removal of a product from a source location where the product is stored to an optimized destination location. Packing generally involves removing stock from a storage bin and placing it into a pick handling unit. Depending on your packing requirements, the pick HU may be taken to a packing work center where the products in the pick HU are packed further into other HUs for shipping.

General Processes

The following processes occur throughout all process stages:

- Resource and labor management

  The resource management function links warehouse resources, people, and material handling equipment to the RF environment to ensure that the proper resources are assigned to a warehouse order. Labor management provides a series of functions that are used to do the following:

  - Plan labor times and resources in your warehouse, making your warehouse more productive.
  - Measure, plan, simulate, and visualize the activities in your warehouse.
  - Compare and evaluate the performance of warehouse employees. Incentives are triggered in a connected HR system for bonus payments.

  With measurement services, you can define the performance parameters and key performance indicators (KPIs) to be calculated. This information is used to evaluate planned versus actual performance and individual employee performance.

- Cross docking

  With cross docking, you transport the products or handling units (HUs) directly from goods receipt to goods issue without storing them. With unplanned processes, such as push deployment (PD) and pick from goods receipt (PFGR), you start by using a standard goods receipt process.

  Transportation cross-docking (TCD), a planned cross docking process, transports HUs across different distribution centers or warehouses to the final destination. If the final destination is a customer site, TCD is based on a sales order in SAP ERP or SAP CRM. If the HUs are moved between warehouses, TCD is based on a stock transfer order.

- Yard management

  Yard management is used to monitor and manage transportation units (TUs) that arrive to deliver or pickup goods to or from the warehouse.

- Import/Export of products, compliance. and handling of hazardous materials

  Environmental Health and Safety (EH&S) functions provide support for the proper handling and storage of hazardous substances in the warehouse, and ensure that they are transported in accordance with the various governmental regulations. You obtain the hazardous substances data used in the EH&S services function by integrating the EH&S application in the SAP ERP system. For import and export control and handling, you use SAP Global Trade Services (SAP GTS) together with SAP EWM.

- Native technologies (RF, RFID, Pick by Voice, Material Flow System)

  Mobile data entry using mobile radio frequency (RF) terminals and radio frequency identification (RFID) tags are used for all warehouse processes. You can use RFID tags with the SAP AutoID Infrastructure (AII) component for inbound, outbound, and internal product movements. For warehouses that have automated storage/retrieval systems (AS/RS), SAP EWM provides the Material Flow System (MFS) and Warehouse Control Unit (WCU) to interface with these systems.

SAP EWM Documents

With minor exceptions, all process-related data is communicated between the SAP ERP and SAP EWM systems in delivery documents. A delivery document contains all the data required to document and control a business process.

Note:
Basically the scenarios described below are the same, no matter if the ERP part is a SAP Business Suite ERP or a SAP S/4HANA system, connected with a decentralized EWM, or if the EWM part is a SAP S/4HANA embedded SAP EWM. The delivery is created in SAP ERP and sent to SAP EWM.

Exceptions from this process flow are:

- Advanced Production Integration: when using the advanced production integration, a production material request (PMR) is directly created in the EWM system when material staging is requested from the manufacturing order. The PMR technically is like other delivery documents in EWM, but there is no corresponding delivery document in ERP.
- Direct outbound deliveries: when you create a direct outbound delivery the process is started in EWM and the delivery is then copied to ERP.
- Kit-to-Stock: when the kit-to-stock process is started in EWM, an inbound delivery and an outbound delivery order is first created in EWM and then copied to ERP.

Inbound Process Documents

The inbound process flow for a procurement process and the relationship of the inbound delivery documents is shown in the following figure:

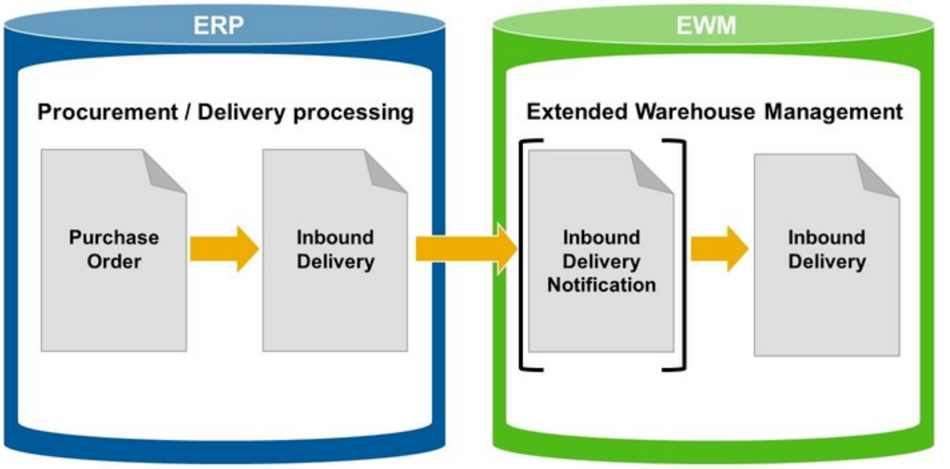

ERP
Procurement / Delivery processing
Purchase Order
Inbound Delivery
EWM
Extended Warehouse Management
Inbound Delivery Notification
Inbound Delivery

Figure 4: Inbound Process Documents

The inbound delivery process is represented in the system by the following documents:

- Inbound delivery notification

This document contains the relevant logistics data for the inbound delivery process, beginning with the origin of the inbound delivery (shipping notification, delivery note, or purchase order). The document also contains the data from the advanced shipping notification received from the supplier. In SAP S/4HANA embedded EWM, the inbound delivery notification does not exist. Since SAP EWM 9.5, or with the use of SAP S/4HANA decentralized EWM, the use of the inbound delivery notification is optional.

- Inbound delivery

  This document contains the data required for triggering and monitoring the complete inbound delivery process. This process starts upon receipt of the goods in the yard and ends when the goods have arrived at the final putaway bin. The inbound delivery is created after activating an inbound delivery notification, and it inherits all the relevant data from the inbound delivery notification.

Outbound Process Documents

The outbound process flow, indicating the relationships of the outbound delivery documents, is shown in the following figure:

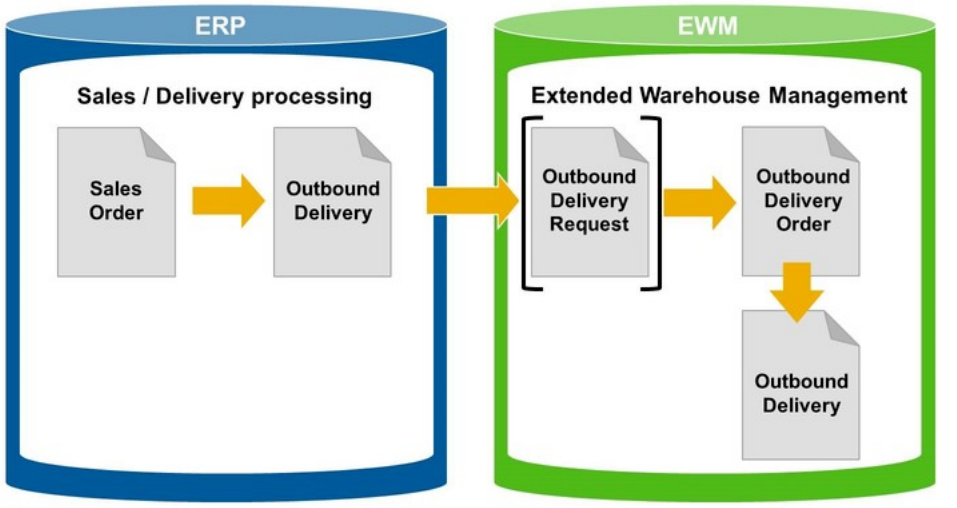

ERP
Sales / Delivery processing
Sales Order
Outbound Delivery
EWM
Extended Warehouse Management
Outbound Delivery Request
Outbound Delivery Order
Outbound Delivery

Figure 5: Outbound Process Documents

The outbound delivery process is represented in the system by the following documents:

- Outbound delivery request:

  This document contains the relevant logistics data for the outbound delivery process, starting with the origin of the outbound delivery process, for example, the sales order. The outbound delivery request inherits data from a reference document (an outbound delivery), and creates an outbound delivery order.

  In SAP S/4HANA embedded EWM, the outbound delivery request does not exist. Instead, the outbound delivery order is created directly. Since SAP EWM 9.5, or with the use of SAP S/4HANA-based decentralized EWM, the use of the outbound delivery request is optional.

- Outbound delivery order

This document contains the data required for triggering and monitoring the complete outbound delivery process. The process starts with the initial planning activities for the outbound delivery and continues until the goods have been loaded and sent.

- Outbound delivery

  This document represents the goods to be delivered together to a single goods recipient. This document is created in order to control a delivery split. It is always created, whether a split occurs or not.

Posting Change Documents

The posting changes process flow, indicating the relationships of the posting changes documents, is shown in the following figure:

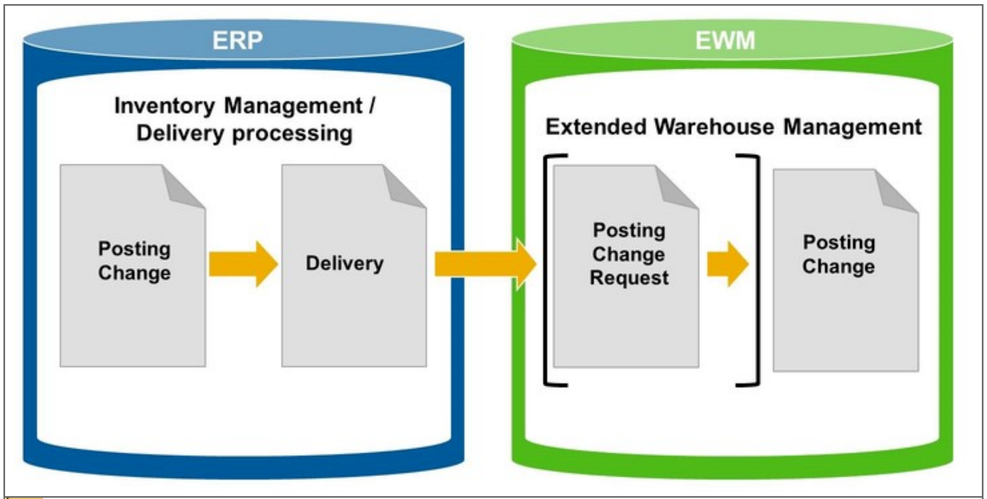

ERP
Inventory Management / Delivery processing
Posting Change
Delivery
EWM
Extended Warehouse Management
Posting Change Request
Posting Change

Figure 6: Posting Changes Documents

Posting changes are generated internally in SAP EWM or you can create them in the SAP ERP system. In SAP EWM, the term posting change is used to refer to a change in the material/ product, batch, stock type, or stock usage. For example, you could use a posting change to scrap a product that has been damaged in the warehouse. Posting changes initiated in SAP ERP are processed in SAP EWM by using the following documents:

- Posting change request

  This document contains all the relevant logistics data that the system copies over from the initiator of the process, that is, the delivery that comes from SAP ERP.

  In SAP S/4HANA embedded EWM, the posting change request does not exist. Since SAP EWM 9.5, or with SAP S/4HANA decentralized EWM, the use of the posting change request is optional.

- Posting change

  This document contains the data required for triggering and monitoring the complete posting change process. It is from this document that the warehouse tasks are created to carry out the posting change movement.

Warehouse Request Documents

A warehouse request is an EWM document that enables processing of warehouse activities. These activities are steps like goods receipt or goods issue posting, posting changes, putaway or picking. So the inbound delivery, the outbound delivery order, or the posting change are examples for warehouse requests.

From the warehouse request documents, SAP EWM creates the warehouse tasks required to complete the warehouse processes. When a warehouse request is created, a warehouse process type is determined for the document. The warehouse process type contains data related to the direction of the movement (putaway, picking), location information (default source or destination), and process-related settings.

Warehouse Tasks

SAP EWM uses warehouse tasks and warehouse orders to execute the physical movement of goods in the warehouse.

A warehouse task is an EWM document created to execute logical or physical goods movements or stock changes, such as the following:

- Putaway

  A putaway task is a goods movement that moves a quantity of a product from a source location to a destination putaway bin.

- Picking

  A picking task directs the removal of a product from a source location where the product is stored to a destination location.

- Posting changes

  A posting change is used to reassign a quantity of a product to a different plant and stock type, or when its stock category changes. For example, if a quantity of a product is to be scrapped, its stock category changes from unrestricted to scrapped.

- Internal goods movements

  Internal goods movement tasks are generally “bin-to-bin” movements created to move a quantity of a product from a source location to a destination location within the same warehouse. Examples include product replenishments, warehouse reorganizations, and ad hoc movements of stock. You execute the internal stock transfer directly from storage bin A to storage bin B without an intermediate stop (such as a packing station). As a result, there is one picking and putaway bin for every internal movement.

- Goods receipt postings

  Goods receipt posting tasks are generated in SAP EWM to represent the goods receipt inventory posting in the SAP ERP system.

- Goods issue postings

  Goods issue posting tasks are generated during the goods issue process, and represent the goods issue posting in the SAP ERP system.

Warehouse tasks can be created manually. They are triggered automatically from a process like wave picking or generated dynamically as a result of a preceding warehouse movement. They are created either with a reference to a warehouse request document, or without a reference, for example for an internal goods movement. Warehouse tasks are controlled by the warehouse process type.

There are two types of warehouse tasks: **product** warehouse tasks and **handling unit (HU)** warehouse tasks.

Product Warehouse Task

Product warehouse tasks contain the information required to execute the physical transfer of products into the warehouse, out of the warehouse, or within the warehouse, from one storage bin to another.

A product warehouse task contains the following information:

- The product to be moved

  For goods receipt postings, the product warehouse task consists of the product that increases the stock. For goods issue postings, the product warehouse task contains the product that decreases the stock. A posting change product warehouse task contains both the product that decreases the stock and the product that increases the stock.

- The quantity to be moved
- The source location from which the product will be moved
- The destination location to which the product will be moved

A product warehouse task reserves the quantities, so they are no longer available for other product warehouse tasks.

HU Warehouse Task

A HU warehouse task is an EWM document that represents a physical movement of a handling unit with the product or products inside. The HU warehouse task contains all the information required to execute the physical transfer of HUs within the warehouse from a source location to destination location. HU warehouse tasks are also used in the loading and unloading process.

The HU warehouse task contains the following information:

- The HU to be moved
- The source location from which the HU will be moved
- The destination location to which the HU will be moved

Unlike the product warehouse task, the HU warehouse task does not reserve stock.

Warehouse Orders

Warehouse tasks are grouped into warehouse orders to form work packages for warehouse employees (resources) to perform. The warehouse order consists of warehouse tasks or physical inventory items. After warehouse tasks are created, they are assigned to warehouse orders based on warehouse order creation rules (WOCRs). WOCRs are defined in customizing and are determined for activity areas and activities. The source or destination bins in the warehouse tasks are used to determine the activity areas used to obtain the WOCRs that are applied to the task.

LESSON SUMMARY

You should now be able to:

- Describe the basics of SAP EWM

Unit 1

Learning Assessment

1. Match the following processes to their SAP EWM process areas:

   Match the item in the first column to the corresponding item in the second column.

Transportation unit processing
Physical inventory
Picking optimization

Storage and operations
Outbound processing
Inbound and outbound processing

Unit 1

Learning Assessment - Answers

1. Match the following processes to their SAP EWM process areas:

   Match the item in the first column to the corresponding item in the second column.

Transportation unit processing
Physical inventory
Picking optimization

Inbound and outbound processing
Storage and operations
Outbound processing

That's correct! Transportation unit processing take place during inbound and outbound processing. Physical inventory takes place during storage and operations. Picking optimization takes place during outbound processing.

UNIT 2 Integration

Lesson 1

Setting Up the Integration Between SAP ERP and SAP EWM 15

Lesson 2

Setting Up Delivery Document Integration 20

UNIT OBJECTIVES

- Set up the integration between SAP ERP and SAP EWM
- Set up delivery document integration

Unit 2
Lesson 1

Setting Up the Integration Between SAP ERP and SAP EWM

LESSON OVERVIEW

In this lesson, you learn the basic integration settings necessary to establish a connection between the SAP ERP system and the SAP Extended Warehouse Management System (SAP EWM).

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Set up the integration between SAP ERP and SAP EWM

SAP ERP Settings

A key step in linking an SAP ERP system and an SAP EWM system is configuring the necessary application link enabling (ALE) settings. Most steps are not really EWM specific, they are required in general for the communication between two SAP systems. Also in a SAP S/4HANA with embedded EWM most of these settings are required. The details are a little different, but, in general, the requirements are the same.

> Note:
> "SAP ERP" refers to a SAP Business Suite ERP as well as to a SAP S/4HANA system that is only being used for ERP.

These are settings probably not done by a person responsible for the application settings, but from someone in the system administration, as the overall system landscape and settings are to be considered. The most important settings include the following steps:

1. Define a logical system for each system and assign it to the client being used in each server. In our example, we assign ZMECLNT800 to client 800 of the SAP ERP system, and assign T43CLNT800 to client 800 of the SAP EWM system.
2. Define an RFC user in each target system / client.
3. In ALE customizing for both systems, define RFC destinations with the same name as the logical systems (in our example ZMECLNT800 and T43CLNT800).

This is a very simple view on the settings, as a regular system landscape, consisting of a development, test, and productive system used different names in each landscape and changes are required accordingly after transports or copies of systems.

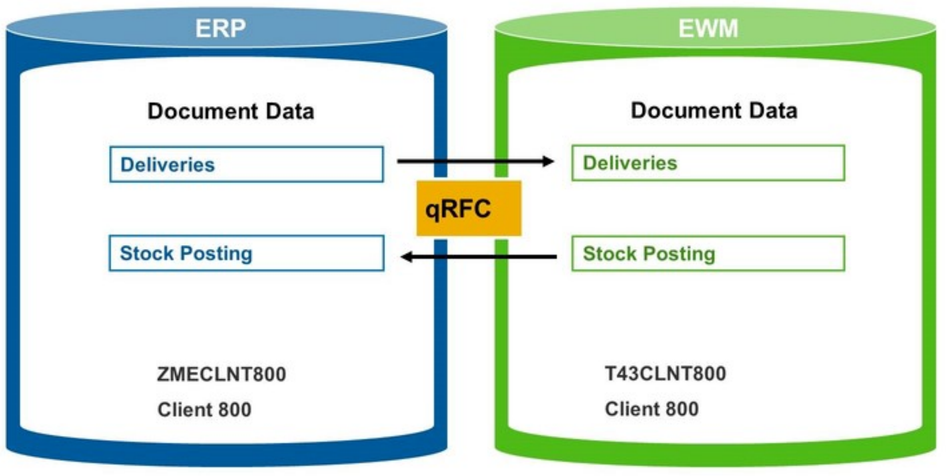


Figure 7: Document Data Flow

Note:
The technical settings and the settings for integration described in the following sections are explained in detail in the SAP Solution Manager documentation for the SAP EWM integration. A link to this documentation can be found on the page for SAP Extended Warehouse Management on SAP Help portal at: http://help.sap.com. The SAP Best Practices Explorer also contains several documents specifically in regards to S/4HANA, it can be found at: http://rapid.sap.com.

SAP ERP-SAP EWM Warehouse Linkage

To create the link between Inventory Management in the SAP ERP system and SAP EWM, you maintain certain configuration settings in the SAP ERP system. These settings allow the system to determine warehouse management relevancy based on the plant and storage location information in source documents such as inbound and outbound delivery documents. These settings are also used to determine the SAP EWM warehouse used for processing. The following figure illustrates the basic organizational relationships in a plant-storage location assignment that were established through the configuration settings:

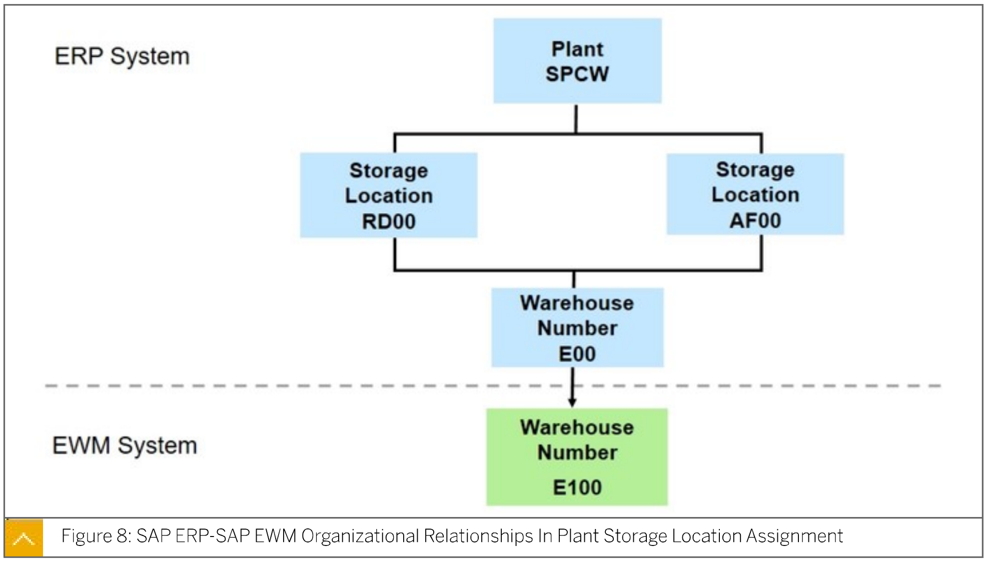


Figure 8: SAP ERP-SAP EWM Organizational Relationships In Plant Storage Location Assignment

You create a warehouse in the standard warehouse management (WM) definition table to represent the SAP EWM warehouse in the SAP ERP system. When you create this warehouse, assign it to the plant and storage locations used to represent the inventory management stock balances of the materials or products managed in the SAP EWM warehouse.

This warehouse is then activated as EWM warehouse and a distribution model is created to ensure the transfer of SAP ERP delivery data to and from the SAP EWM system.

At the activation of the warehouse as EWM warehouse you have the following options:

- Comm. WM (Communication external WM)

  The correct entry for EWM is *Queued and Serialized Asynchronous RFC* .

- UD (Unchecked Deliveries)

  With this flag you can control if *unchecked deliveries* are to be distributed. An unchecked delivery is a delivery with a reduced scope of check. This reduced scope of check refers mainly to the availability checks, but can also affect other checks. CRM can create unchecked deliveries in ERP.

- Dist. Mode (Distribution Mode)

  The distribution mode controls if a delivery is distributed immediately at creation (default entry) or not (*Stop distribution*). If the distribution is not done immediately, you trigger the distribution in the *Outbound Delivery Monitor* (*For Distribution*) or with transaction `VL06D`. You can override this default setting through the entry in the *Distribution Mode* of the delivery type. Additionally a form routine controls the distribution. By manipulating this form routine, you can implement specific checks and requirements. You can find this by using the transaction code `VOFM` and choosing *Requirements* → *Subsequent functions* → *Distribution*.

- SN Dec. WM (Allow Serial Numbers in Decentralized WMS)

  Once you have selected that the warehouse number is an EWM warehouse, this indicator is set and not changeable anymore. It means that you can work with serial numbers in EWM, the details are controlled by the serial number profiles.

- BatchDetEW (Batch Determination in EWM via Batch Attribute Replication)

  This indicator controls the behavior of the automatic batch determination in ERP outbound deliveries.

- GR fr. EWM only (Goods Receipt from EWM Only)

  This indicator enables you to control whether the process of posting the goods receipt for a manufacturing order into an EWM-managed warehouse can be started from both ERP and EWM or from EWM only.

For the **distribution model**you enter:

- The ERP warehouse number
- The logical system key of the EWM system
- A distribution model view

  The distribution model view is how you can later locate the distribution model in the transaction *BD64 - Maintenance of Distribution Model*.

You can select any of the following as *Objects* for the distribution model:

- Inbound Delivery
- Outbound Delivery
- Production Material Request

  or

- All

It is not helpful to have separate models, so *All* is the correct choice. Only in case you would know that the advanced production integration will not be used, it could make sense to select *Inbound Delivery* and *Outbound Delivery* separately.

SAP EWM Integration Settings

You define a **business system**for the EWM and for the ERP system. The SAP EWM system stores the business system in the document flow tables of the cross-system and cross-partner document flow. The business system is a system key that you define in the system landscape directory (SLD).

You map the business systems to their corresponding logical systems, because the delivery documents sent from the SAP ERP system to the SAP EWM system contain only the logical system number of the SAP ERP system. Since SAP EWM stores the business system in the warehouse request document, it uses this table to map the logical system to the business system.

You maintain integrated-related settings in the SAP EWM system to complete the link between both systems. You set control parameters to indicate various data transfer options between the systems. These settings are dependent on the business system of the connected SAP ERP system, and the release and support package. This table is in Customizing for *SCM Extended Warehouse Management* under *Extended Warehouse Management → Interfaces → ERP Integration → General Settings → Set Control Parameters for ERP Version Control* or *Extended Warehouse Management → Interfaces → ERP Integration → ERP Integration for Decentralized EWM → Set Control Parameters for ERP Version Control* (for a SAP S/4HANA-based EWM). SAP provides standard entries for this table.

Note:
It is actually optional to create an entry for the ERP system in this table. If there is no entry in your EWM system, EWM will behave as if the highest possible ERP enhancement package were connected. This table is not used for embedded EWM.

You connect the two warehouse numbers through a mapping table. Here, you map the business system, the SAP ERP intermediate warehouse, and the SAP EWM warehouse. This table is in Customizing for *SCM Extended Warehouse Management* under *Extended Warehouse Management* → *Interfaces* → *ERP Integration* → *General Settings* → *Map Warehouse Numbers from ERP System to EWM System* .

Note:
This mapping is required in decentralized as well as in embedded EWM.

LESSON SUMMARY

You should now be able to:

- Set up the integration between SAP ERP and SAP EWM

Unit 2
Lesson 2

Setting Up Delivery Document Integration

LESSON OVERVIEW

In this lesson, you learn the basic configuration settings related to delivery document integration and processing. Information from delivery documents are the foundation of the process-oriented exchange of data between the ERP system and the EWM system.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Set up delivery document integration

Delivery Document Integration

It is important to understand the basic SAP EWM integration settings for delivery documents.

The following figure provides an overview of the functions supported by the SAP EWM and SAP ERP interface:

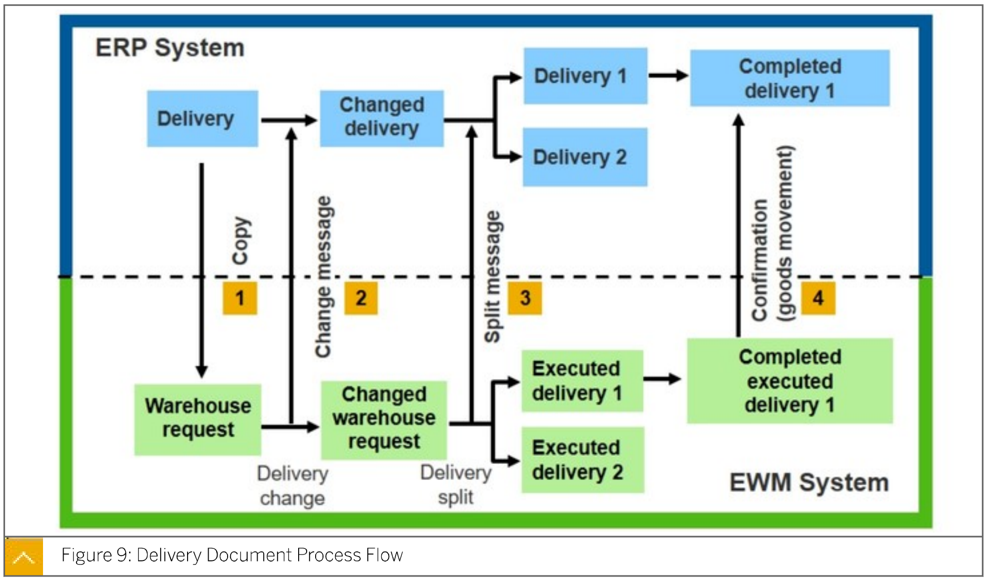


Figure 9: Delivery Document Process Flow

The delivery document is normally created in the SAP ERP system, but it *can* originate in the SAP EWM system, for example, in the case of a direct outbound delivery order or in a kit-to-stock process. Certain changes to delivery documents can happen in the SAP ERP system after the distribution. A changed advanced shipping notice (ASN) from a vendor, for example, can cause inbound delivery changes to be copied from the SAP ERP system to the SAP EWM system.

When EWM is connected to a S/4HANA system, certain fields in outbound deliveries can still be changed depending on the processing status in SAP EWM. For details see the “What’s New in SAP Extended Warehouse Management 9.5” on the SAP Help portal

Changes can always be done from the EWM side. A pick denial in an SAP EWM can result in delivery changes from the SAP EWM system to the SAP ERP system. Delivery splits in SAP EWM can also result in delivery document data to exchange between the SAP EWM system and the SAP ERP system. Another example is sending confirmations of deliveries from EWM for follow-on functions in SAP ERP (for example goods receipt or goods issue).

General SAP EWM Delivery Document Control

The EWM delivery document contains all the data required to document and control a business process. Various documents are used in delivery processing to control the processes.

A document comprises a document header and any number of document items. This structure is illustrated in the following figure.

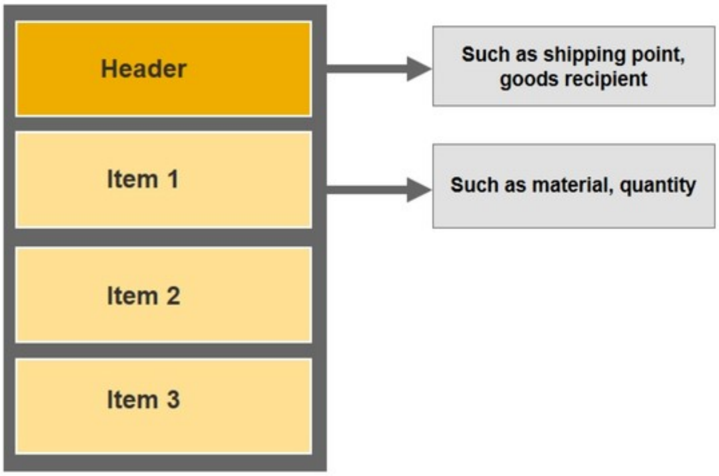

Header
Item 1
Item 2
Item 3
Such as shipping point, goods recipient
Such as material, quantity

Figure 10: EWM Delivery Document Structure

Document Header

General data and data that is relevant for inbound and outbound delivery documents, posting changes, and internal stock transfers is contained in the delivery header. This data is valid for the entire document and includes:

- Goods receiving office or shipping office
- Scheduling data (for example, shipping or delivery date)
- Weights and volumes for the complete delivery
- Ship-from party, sold-to party, and goods recipient numbers

Document Item

In the delivery document, items contain information related to individual products within the delivery.

The following are examples of item-related information:

- Product/material number
- Delivery quantity
- Weight and volume for item
- Location-related information such as goods receiving point or unloading point
- Dates such as goods receipt or picking date
- Tolerances for over and under delivery quantities

Document and Item - Category and Type

Document / Item Category and Document / Item Type

The document header and the document item are defined in the EWM system by using a combination of document / item category and document / item type. Document and item categories are predefined in the system and can not be changed, but a customer can define the required document and item types.

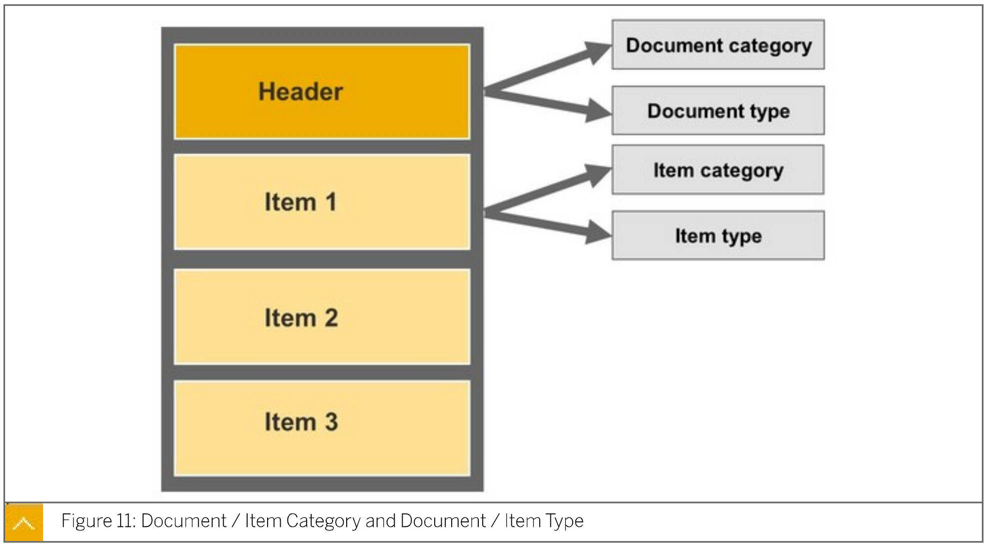
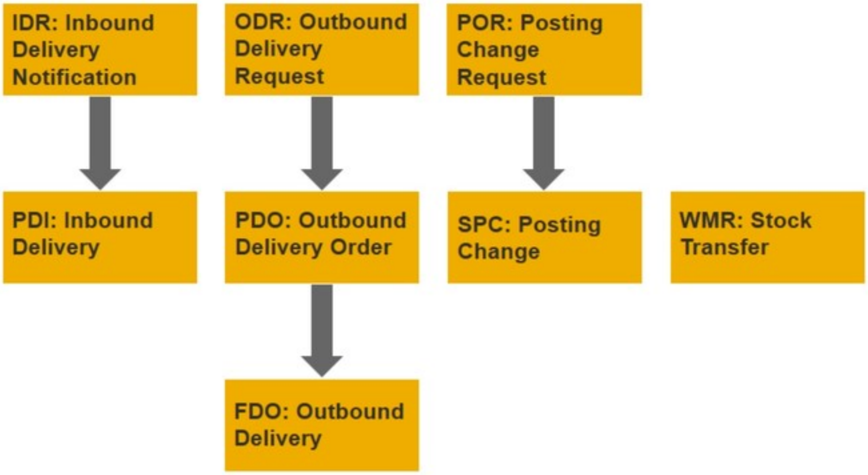


Figure 11: Document / Item Category and Document / Item Type

EWM Document Category

The document category classifies the different documents that can be processed by the system in delivery processing.



IDR: Inbound Delivery Notification

ODR: Outbound Delivery Request

POR: Posting Change Request

PDI: Inbound Delivery

PDO: Outbound Delivery Order

SPC: Posting Change

WMR: Stock Transfer

FDO: Outbound Delivery

Figure 12: Document Categories in Delivery Processing

Note:
The above slide only shows the most important document categories.

The category defines in which business process a document can be used, which customizing settings are possible, and with which transaction the document can be processed.

Some details for the different document categories are described here:

- IDR (Inbound Delivery Notification) and PDI (Inbound Delivery)

  These documents are used during the inbound process. The IDR is created through a message received from the ERP system and triggers a PPF action to create the follow up document, the PDI. In an SAP S/4HANA embedded EWM the IDR does not exist anymore, the PDI is created immediately. In a decentralized EWM (9.5 or based on SAP S/4HANA) the IDR can be skipped.

  By using an *Expected Goods Receipt* document (details are below) the PDI can also be created directly in EWM, without a IDR. The PDI can then create an inbound delivery in ERP or only create a material document, depending on the scenario and customizing settings.

- ODR (Outbound Delivery Request), PDO (Outbound Delivery Order) and FDO (Outbound Delivery)

  These documents are used during the outbound process. The ODR is created through a message received from the ERP system and triggers a PPF action to create the follow up document, the PDO. In an SAP S/4HANA embedded EWM the ODR does not exist anymore, the PDO is created immediately. In a decentralized EWM (9.5 or based on SAP S/4HANA) the ODR can be skipped.

  The PDO can also be created directly in EWM, this is then called a direct outbound delivery order. This PDO then also creates an outbound delivery in ERP.

  For the goods issue posting in EWM and to communicate any delivery split, it is necessary to create the FDO.

- POR (Posting Change Request) and SPC (Posting Change)

These documents are used during a posting change process. The POR is created through a message received from the ERP system and triggers a PPF action to create the follow up document, the SPC. In an SAP S/4HANA embedded EWM the POR does not exist anymore, the SPC is created immediately. In a decentralized EWM (9.5 or based on SAP S/4HANA) the POR can be skipped.

The SPC can be created directly in EWM to trigger a posting change.

- WMR (Stock Transfer)

  The WMR can only be created directly in EWM. It is used to plan a warehouse internal physical movement.

Besides the above listed document categories, some other, more specialized, document categories exist:

- GRN (Expected Goods Receipt Notification) and EGR (Expected Goods Receipt)

  The expected goods receipt process is a planning process to enable warehouse managers to get an overview about the planned inbound workload. The EGR can then be used to create a PDI, which is then further processed in the warehouse.

  The GRN is created through a report either in ERP or in EWM and triggers a PPF action to create the follow up document, the EGR. In a decentralized EWM 9.5 or based on SAP S/4HANA the GRN can be skipped.

  In SAP S/4HANA embedded EWM neither the GRN nor the EGR exit. The process steps based on these documents (inbound workload overview or creation of the PDI in EWM) are still possible, they simply don't require these documents.

- PWR (Production Material Request)

  The PWR is created in EWM for a manufacturing order in ERP in the advanced production integration. There is no delivery in ERP and there is no other interim document in EWM.

Warehouse Request

A PDI (Inbound Delivery), PDO (Outbound Delivery Order), SPC (Posting Change) and WMR (Stock Transfer) are all *Warehouse Requests* . This is the generic term for a delivery document in EWM that enables the processing warehouse activities for a specific product. These activities can be warehouse tasks (for physical movements or posting changes) or goods receipt / goods issue postings.

EWM Document Type

The EWM document type classifies a document with regard to the primary business use of the document.

The following figure lists examples of EWM document types:

Table 1: EWM Document Types

Doc. Type	Description
INB	Inbound Delivery
INBI	Inbound Delivery, production
OUTB	Outbound Delivery
SREA	Warehouse Reorganization
SRPL	Replenishment

Doc. Type	Description
SWHI	Stock Transfer
TWPR	Posting Change

EWM Delivery Documents

In EWM a delivery document is always a combination of a document category and a document type. Examples for EWM delivery documents and their respective document type and document category are listed in the following figure:

Table 2: EWM Delivery Documents

Doc. Type	Doc. Cat.	Description
INB	IDR	Inbound Delivery Notification
INB	PDI	Inbound Delivery
OUTB	ODR	Outbound Delivery Request
OUTB	PDO	Outbound Delivery Order
OUTB	FDO	Outbound Delivery
SRPL	WMR	Replenishment
SWHI	WMR	Stock Transfer
TWPR	POR	Posting Change Request
TWPR	SPC	Posting Change

Each combination of document type and document category in the table represents a document in an EWM business process. You can create your own document types in each process configuration, such as goods receipt, goods issue, stock transfers, and posting changes.

As there are less document categories in SAP S/4HANA embedded EWM, there are less combinations accordingly.

SAP supplies these above listed and several other document types as default customizing or via Business Configuration Sets and recommends to use these delivery documents as they are or as templates for defining your own document types.

EWM Item Categories and Item Types

Each delivery document item is identified by the following:

- An item type
- The document type of the delivery document in which it appears
- The item category, which classifies the delivery item by its basic use

The following table lists the item categories:

Table 3: Item Categories

Item Category	Description
DLV	Standard Delivery Item
PAC	Packing item
RET	Returns Item
TXT	Text Item
VAL	Value Item (used only in outbound delivery processing)

Delivery item types classify the items for a document type for the complete business process. The item type defines the business characteristics of the item in a delivery document.

The following table lists examples of item types.

Table 4: Item Types

Item Type	Description
IDLV	Standard item - Inbound Delivery
ODLV	Standard item - Outbound Delivery
TWPR	Standard item - Posting Change

Similar to document types, SAP has predefined several combinations of item category and item type for several document types to enable processing of standard processes. You can configure your own item types to represent delivery items that have business characteristics that are different from the standard.

Service Profiles

In EWM, delivery documents represent various delivery processes in the system. In delivery processing, a series of service profiles on header and item level are used to determine how the documents and items are processed in SAP EWM. They also define the business scope of the documents, that is, what functions are required in the business processes.

Two types of service profiles are defined within EWM:

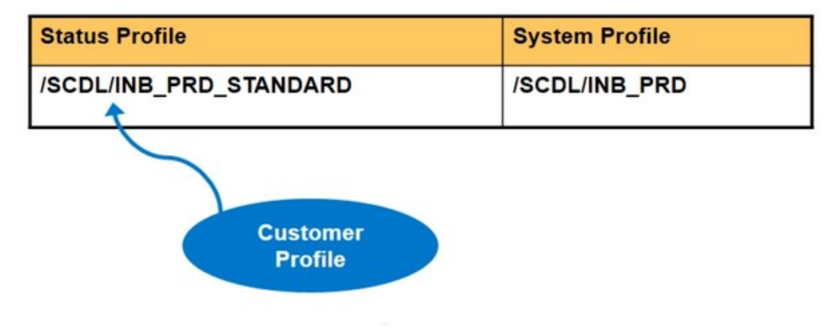
- System profiles
- Customer profiles

System Profiles and Customer Profiles

System profilesare predefined in the EWM system and cannot be changed. They contain configuration settings used as default options in the various delivery document processes. Internally, system profiles are linked to the document categories for profiles related to document headers, and to the item categories for profile settings related to document items.

To configure your own business processes, you create **customer profiles** Customer profiles are always linked to the corresponding system profile. SAP has also created a set of predefined customer profiles for the standard delivery processes.

An example of a customer profile and its corresponding system profile for status management is shown in the following figure.



Status Profile	System Profile
/SCDL/INB_PRD_STANDARD	/SCDL/INB_PRD

Figure 13: Customer Profile and its corresponding System Profile

Document and Item Profiles

The customer profiles are assigned to the delivery document types and item types.

The following profiles are available on header and / or item level (details are described in the next paragraphs):

- Action profile (only on header level)
- Status profile
- Text profile
- Field control profile
- Partner profile
- Date profile
- Incompletion profile
- Quantity offsetting profile
- Reference document category profile
- Process profile
- Process code profile (only on item level)

Action Profile (for Post Processing Framework (PPF))

Message/output control for delivery processing uses Post Processing Framework (PPF). The PPF is a Basis component that generates actions from the data of an application according to an action definition (for example, the printing of a delivery note). PPF provides the tools for scheduling, starting, and monitoring actions. Actions are saved in an action profile, which is linked to the document type.

In addition to printing-related actions, actions can include:

- Activating delivery documents such as inbound delivery notification or outbound delivery requests
- Posting goods issue or receipt

Note:
The action profile on header level is the only service profile, which is **not** based on a system profile.

Status Management

Status management controls business transactions used to process a delivery document by assigning one or more statuses to the document.

Status profiles are assigned to delivery types and item types. A status profile contains status types that describe a process in the overall processing life cycle of a delivery document such as a goods receipt status, an unloading status, or a putaway status. Each status type has one or more valid status values assigned to it such as *Yes/No* , *Not started/In Process/Completed* . The status value allows or disallows a business transaction. A business transaction can set a new status value.

Text Management

Text management allows texts to be received via delivery documents from the SAP ERP system and processed within SAP EWM delivery documents. New texts can also be created and saved within EWM delivery documents, and you can display, change, or delete texts. Text management supports texts at the delivery header and item level.

In SAP EWM, text types representing particular notes such as "shipping instructions" and "preferred carrier" are defined. Text profiles group text types for a particular delivery header or item. Within the text profile, the access sequence for each text type indicates the source of the text. Text profiles used to specify texts for delivery headers are assigned to the document type; whereas, text profiles used for delivery item texts are assigned to the item type.

Field Control

Delivery documents contain a multitude of fields that contain the data used and required in delivery processing. In addition to status management, field control determines which fields are displayed and changed during delivery document processing. The fields that appear in the delivery header and item structures are determined and controlled by the field control function.

Delivery processing uses field control during the following events:

- The creation of a document or document item
- When switching between display mode and change mode
- After data is changed in a document

All fields in a delivery document are defined in the system as components of structures. Every component in the structure is uniquely identified by the logical field name, and can be addressed directly. In the field attributes assigned to the fields, the system defines the processing characteristics of each field. The list of assigned fields and their field attributes for a particular document type or item type is assigned to a system profile. The field attributes in the system profile cannot be changed, however, you can create new field names by using the system profile. The assignment to the delivery document type or item type is done using the field control profile. A field control profile contains all the allowed fields and their attributes for a particular document or item type. Every field control profile is assigned to a system profile.

SAP provides predefined logical field names, system profiles, and field control profiles for all of the standard delivery processes.

Partner Processing

Partner processing is used to maintain partner information in the header and/or item data in EWM delivery documents. Partner processing configuration begins with the creation of partner roles. The partner role is used to represent a role or a function in the business process. Examples of possible partner roles are: supplier, receiving office, ship-to recipient, and warehouse. Partner roles are identified by a key, a description, and a role category. The role category defines the nature and use of the partner identified by the partner role. The following role categories are available:

- Business partner
- Location
- Organizational unit

Partner roles are assigned to partner profiles. The partner profiles are assigned to the document types and item types where they are used. SAP has created predefined partner profiles for the standard EWM delivery documents. These profiles are the partner processing system profiles and cannot be changed. In these profiles SAP has defined the partner profiles with mandatory and optional partner roles.

Date Types

The date types system function configures the various dates related to delivery processing in SAP EWM. The dates that are supported by the system are defined as date types. Note that the date always includes the time. The EWM application functions determine the supported date types. As a rule, the EWM date types should match the date types defined in configurable process scheduling. Examples of date types include: delivery date, goods issue date, start of loading, end of loading, and pick/pack start.

Date profiles are pre-configured in the EWM system for all of the standard delivery types and item types. Each date profile is assigned to a system profile. Contained within the date profile are the date types that are to be used in the delivery type or item type to which the profile is assigned. If you do not define a date profile for a document type or an item type, the settings from the system profile are used automatically.

Incompleteness Check

Use the incompleteness check to ensure that all relevant fields in a delivery document have been filled. The incompleteness check uses the logical field names assigned to the system profile of the field control for its check. To set up the check, create an incompletion profile that contains every mandatory input and output field that must be filled in order to process the document. These fields are defined by their logical field names. Each field contained within the incompletion profile is assigned a business action code such as “Save”, “Goods Issue”, or “Check”. The action codes determine when the field is checked for completeness.

The incompletion profile is assigned to the document or item type, to which it will be applied. Pre-configured incompleteness profiles and settings are provided by SAP for the standard processes in delivery processing.

Quantity Offsetting

In delivery processing, you use quantity offsetting to calculate the open quantities for a document, or to calculate specific quantities such as *requested quantity* and *reduced quantity*. You execute quantity offsetting at the item level of a delivery document. To execute quantity offsetting automatically, use a quantity offsetting profile. The quantity offsetting profile contains the quantity calculation and the quantity offsetting rules to be used to calculate the desired quantities. The quantity offsetting profile is assigned to the delivery document type and the delivery document item type.

Reference Documents

In the reference documents service profile configuration, the allowed preceding document references are configured. Within the system and customer profiles, the permitted reference documents are defined using reference document category codes. The reference document customer/system profiles are assigned to the document categories where they will be used. SAP provides a pre-configured set of profiles for the standard EWM delivery document and item categories.

Process Management and Control

SAP EWM uses the process management and control function to control whether certain processes or functions are permissible for a delivery type or item.

The following process indicators can be set for the delivery header control:

- Manual creation - controls whether a document can be created manually in SAP EWM
- Deletion of warehouse request with follow-up documents - controls whether you can delete warehouse requests after the creation and cancellation of successor documents
- Preceding document - allows reference to a preceding document
- Production - allows processes for production such as kit-to-stock or goods receipt from production
- Scrapping - allows subprocesses for scrapping
- Pickup - allows process for sales without transportation processing
- Invoice before goods issue - allows an invoice to be created before the goods issue
- Correction delivery - allows posting of differences to the stock to be cleared using a correction delivery document
- Communication to SAP ERP - for the advanced production integration the system can use the goods movement interface only
- Goods receipt mode - when the system communicates the goods receipt to SAP ERP
- Unique ASN number - you can use this field to control whether the system checks if the advanced shipping notification (ASN) number is unique for the ship-from party and business system or not

Note:
The last two controls can also be set in settings which reference the SAP ERP system. As these settings are not available in an embedded SAP EWM, they were added to the process indicators.

At the item level the following process indicators can be set:

- Create manually - an item can be created manually in a delivery document without reference to a line item in a preceding document
- Invoice before GI - allows the billing of a line item before its goods issue posting

Like other system functions, process management and control contains SAP pre-created system profiles for the standard delivery categories and item categories.

Process codes

Process codes are used to control particular exceptional situations, for example, when a delivery quantity is larger or smaller than the actual quantity delivered.

Each process code profile is assigned to a system profile. The process code profile determines which process codes have been assigned in the corresponding system profile. If you want to change the process codes assigned to a business process, you can define a new process code profile for a system profile.

SAP has defined system profiles for the process codes for the standard processes in delivery processing. You cannot change them. If you do not define a process code profile for a item type, the settings from the system profile of the corresponding item category are used automatically.

Service Profile Assignment and Delivery Document Configuration

Within each SAP EWM business process, the delivery document types and item types are configured with their general and service profile settings. The following figure shows the basic relationships in this Customizing process.

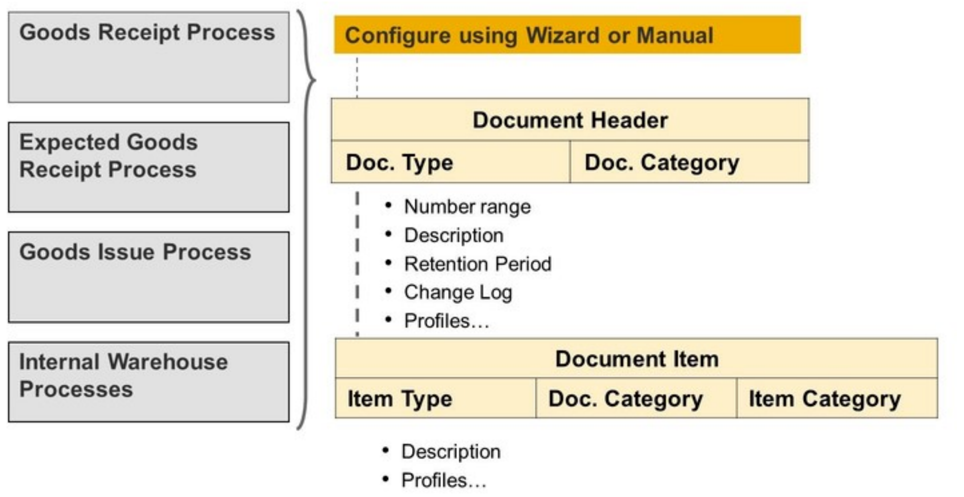


Figure 14: Service Profile Assignment

Note:
SAP strongly recommends that you use the available BC sets for the initial set up of document and item types, profiles, mappings, and so on. For details see the following notes:

2450387 - Which document type or item type for which warehouse request?

2464460 - Restricted usage of BC sets in embedded EWM in SAP S/4HANA and in decentralized EWM

1227714 - FAQ: BC Sets and delivery Customizing in EWM

1113387 - FAQ: Customizing and BC Sets in EWM delivery processing

Delivery Document Determination

When SAP EWM delivery documents are created as successor documents, or manually without reference to a document (if permitted), the system uses determination tables to assign the document type and item types to the new delivery document that is being created. Delivery document type and item type determination tables are in the business process configuration activities in Customizing:

- Goods receipt
- Goods issue
- Internal warehouse processes - includes posting changes and internal stock transfers.

The following figure illustrates the delivery type determination process.

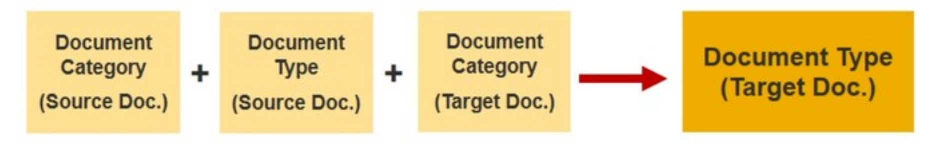

Document Category (Source Doc.)
+
Document Type (Source Doc.)
+
Document Category (Target Doc.)
Document Type (Target Doc.)

Figure 15: EWM Delivery Type Determination

As described in SAP Note 1227714, it is no longer necessary to maintain these determination tables if the successor document type is identical to the predecessor document type.

EWM Delivery Item Type Determination

To determine an item type for a delivery item, the system uses a group of fields as illustrated in the following figure.

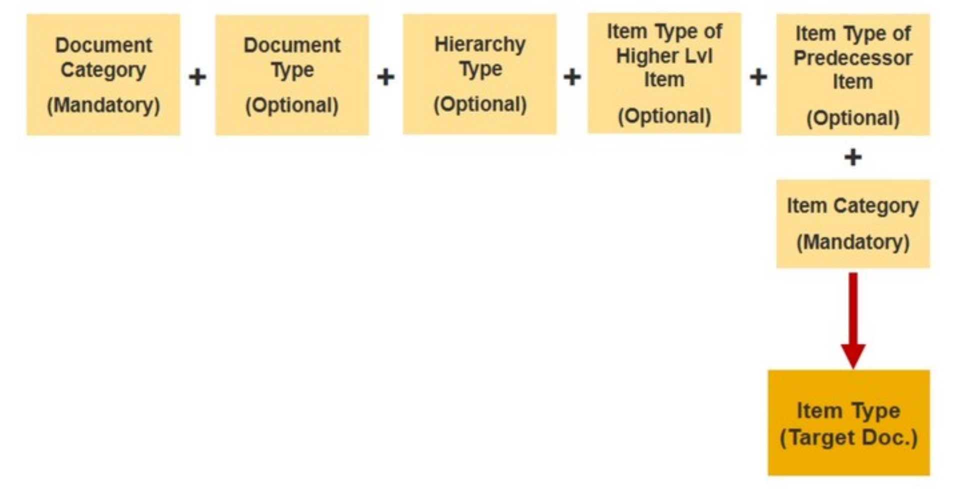

Document Category (Mandatory)
+
Document Type (Optional)
+
Hierarchy Type (Optional)
+
Item Type of Higher Lvl Item (Optional)
+
Item Type of Predecessor Item (Optional)
+
Item Category (Mandatory)
Item Type (Target Doc.)

Figure 16: EWM Delivery Item Type Determination

Item type determination occurs in sequence of the largest amount of entered information first, therefore a complete entry is evaluated before an empty field.

SAP ERP Document to SAP EWM Document Integration

SAP ERP Document Type to SAP EWM Document Type Mapping

For the determination of the EWM document type, you maintain delivery integration settings in the SAP EWM system. SAP provides a set of standard settings for the common SAP delivery documents. The following figure shows how the SAP ERP delivery document type is mapped to the SAP EWM delivery document type.

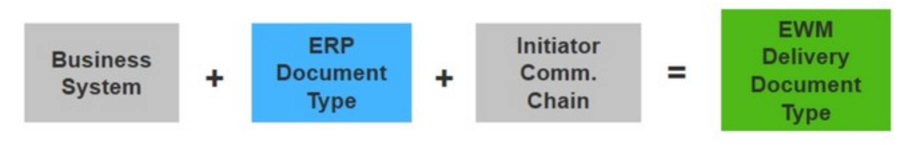


Figure 17: SAP ERP Document Type to SAP EWM Document Type Mapping

In a decentralized EWM system the “EWM delivery document type” would be an *Inbound Delivery Notification*, an *Outbound Delivery Request*, or a *Posting Order Request*. Since EWM 9.5 or with a decentralized EWM based on SAP S/4HANA it is possible to “skip” these requests or notifications. The path to do this is EWM Customizing, *SCM Extended Warehouse Management → Extended Warehouse Management → Interfaces → ERP Integration → Delivery Processing → Skip Request for Messages from ERP* (for a SCM based EWM) or *SCM Extended Warehouse Management → Extended Warehouse Management → Interfaces → ERP Integration → ERP Integration for Decentralized EWM → Skip Request for Messages from ERP* (for a SAP SAP S/4HANA-based EWM). This has certain consequences, so you should read the documentation for this Customizing topic before deactivation.

In a SAP S/4HANA embedded EWM these interim documents are generally not created.

The Code for Initiator of a Communication Chain is an additional key which helps to distinguish different processes. This is necessary as sometimes the determination of the document type in ERP is very simple or because additional information is determined within the context of the received delivery information.

ERP Item Category to EWM Item Type Mapping

In addition to mapping delivery document types, the integration between the SAP ERP system and the SAP EWM system includes a mapping table that maps the SAP ERP delivery item categories to the SAP EWM item type code. The following figure illustrates this mapping.

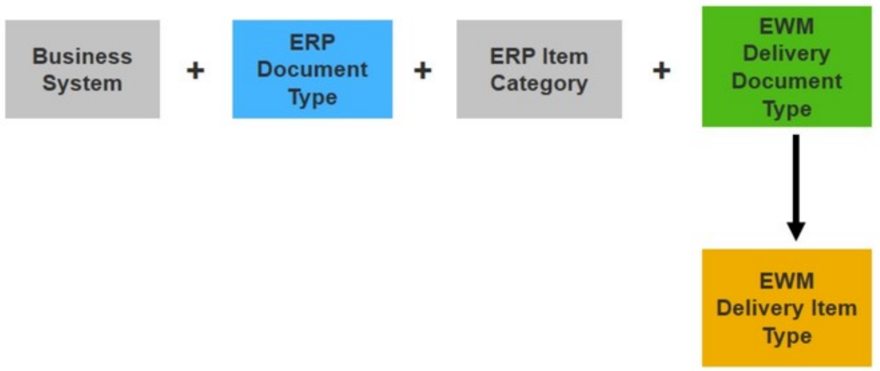


Figure 18: ERP Item Category to EWM Item Type Mapping

In each of the EWM integration tables, the *Business System* field allows mapping of the document types and item categories based on the specific system in which these objects are present.

LESSON SUMMARY

You should now be able to:

- Set up delivery document integration

Unit 2

Learning Assessment

1. To successfully integrate SAP ERP with SAP EWM, in SAP ERP a plant and a storage location are assigned to which of the following?

   Choose the correct answer.

   ☐ A Storage type
   ☐ B Warehouse number
   ☐ C Distribution model
   ☐ D Logical system

2. The integration between the ERP system and the EWM system includes a mapping table that maps the ERP Delivery item categories to the EWM item type code.

   Determine whether this statement is true or false.

   ☐ True
   ☐ False

Unit 2

Learning Assessment - Answers

1. To successfully integrate SAP ERP with SAP EWM, in SAP ERP a plant and a storage location are assigned to which of the following?

   Choose the correct answer.

   ☐ A Storage type

   ☒ B Warehouse number

   ☐ C Distribution model

   ☐ D Logical system

   That's correct! To successfully integrate SAP ERP with SAP EWM, in SAP ERP a plant and a storage location are assigned to a warehouse number.

2. The integration between the ERP system and the EWM system includes a mapping table that maps the ERP Delivery item categories to the EWM item type code.

   Determine whether this statement is true or false.

   ☒ True

   ☐ False

   That's correct! The integration between the ERP system and the EWM system includes a mapping table that maps the ERP delivery item categories to the EWM item type code.

Unit 2

Learning Assessment - Answers

1. To successfully integrate SAP ERP with SAP EWM, in SAP ERP a plant and a storage location are assigned to which of the following?

   Choose the correct answer.

   ☐ A Storage type

   ☒ B Warehouse number

   ☐ C Distribution model

   ☐ D Logical system

   That's correct! To successfully integrate SAP ERP with SAP EWM, in SAP ERP a plant and a storage location are assigned to a warehouse number.

2. The integration between the ERP system and the EWM system includes a mapping table that maps the ERP Delivery item categories to the EWM item type code.

   Determine whether this statement is true or false.

   ☒ True

   ☐ False

   That's correct! The integration between the ERP system and the EWM system includes a mapping table that maps the ERP delivery item categories to the EWM item type code.

UNIT 3

Structural Elements and Master Data

Lesson 1

Creating Structural Elements in SAP EWM 38

Lesson 2

Creating Storage Bins 47

Lesson 3

Creating Work Centers 55

Lesson 4

Transferring Master Data from SAP ERP to SAP EWM 58

Lesson 5

Creating Warehouse Product Master Data 65

Lesson 6

Creating Packaging Specifications 68

UNIT OBJECTIVES

- Create structural elements in SAP EWM
- Create storage bins
- Create work centers
- Transfer master data from SAP ERP to SAP EWM
- Create warehouse product master data
- Create packaging specifications

Unit 3
Lesson 1

Creating Structural Elements in SAP EWM

LESSON OVERVIEW

In this lesson, you learn about the basic structural elements of SAP Extended Warehouse Management including the warehouse complex, storage types, storage sections, storage bins, and activity areas.

Business Example

As a member of the SAP EWM implementation team, you want to create the basic warehouse structure including storage bins, activity areas, and work centers.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Create structural elements in SAP EWM

SAP EWM Structure

The four-character warehouse number, representing the warehouse complex, is at the top of the organizational hierarchy that makes up the EWM structure.

When implementing SAP Extended Warehouse Management (SAP EWM), look at the physical structure of your warehouse or warehouse complex, and create an SAP EWM structure that mirrors this. Define the individual physical areas within the warehouse, such as high-rack storage area, bulk storage area, and fixed bin picking area, as storage types within the warehouse. Also, define storage bins for each storage type. SAP EWM uses these storage bins to manage stock information for all products in the warehouse, at the storage bin level.

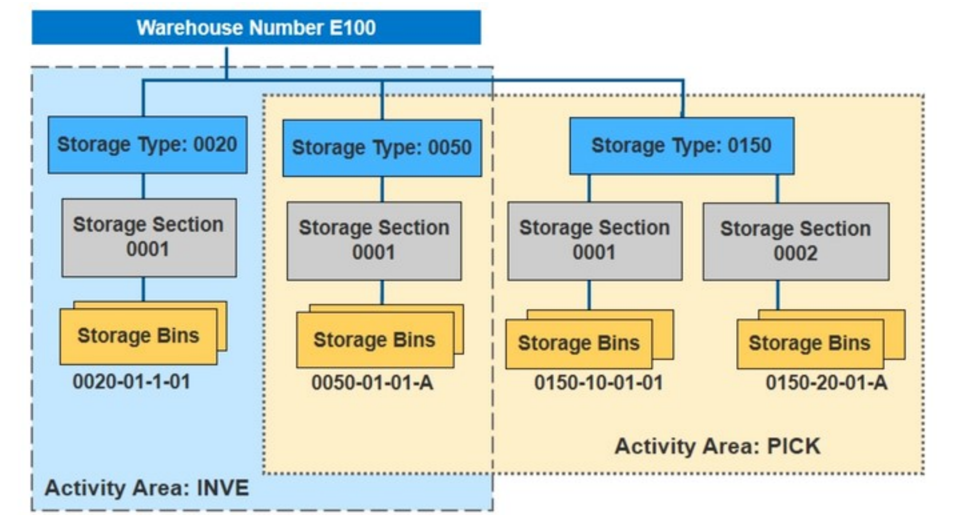


Figure 19: Warehouse Structural Elements

Warehouse Structural Elements

The warehouse structure in warehouse management is divided hierarchically and consists of the following elements:

- Warehouse number

  The warehouse number is a four-character code that represents a single warehouse or warehouse complex.

- Storage type

  A storage type represents a physical storage area in an individual warehouse. The technical, spatial, and organization characteristics are set in the customizing settings.

- Storage section

  Each storage type can be divided into one or more storage sections. Storage bins with specific common attributes, such as storage bins for fast moving items that are close to the goods issue zone, are assigned to one storage section.

- Storage bin

  In each storage type you have one or several storage bins. The coordinates of the storage bin indicate the exact position in the warehouse in which products can be stored.

- Activity area

  An activity area is a logical grouping of storage bins. It can refer to a storage type, or it can represent a group of bins from several storage types. You can either assign storage bins manually to the activity areas, or if there is a 1:1 relationship between storage type and activity area, you can have the system generate the activity area and the assignment.

Warehouse Number

The organizational and physical attributes of a warehouse complex are set in Customizing under a warehouse number. These attributes include the weight unit, volume unit, and time unit. There are also various determination procedures for packaging specifications that are assigned at the warehouse number level.

As a general rule, use one warehouse number for each group of storage areas or buildings (warehousing complex) in the same geographical area. If your warehousing facilities are located in different cities or are physically separated by a longer distance, assign a separate warehouse number to each warehouse complex.

To define a new warehouse in SAP EWM, you can use the *Copy Warehouse Customizing* function to copy either the *warehouse 0001* SAP template or a previously created warehouse. This process creates a new warehouse number with the same entries in all Customizing tables as the warehouse that was copied.

After you create the new warehouse, make a one-time assignment between the warehouse number and a supply chain unitwith the business attribute *warehouse*. You also assign a business partneras *custodian*.

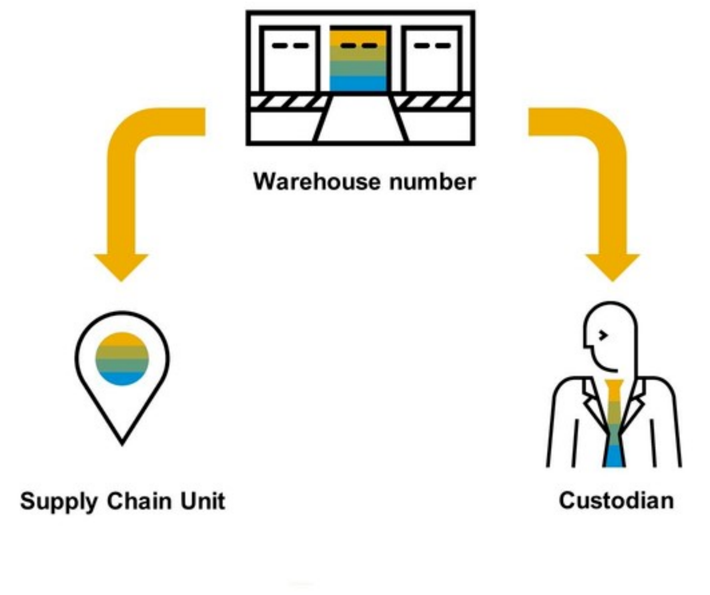


Figure 20: Warehouse Number with Supply Chain Unit and Custodian

Supply Chain Unit

The supply chain unit (SCU) contains essential information for the warehouse complex, such as country, region, and time zone.

In case of a SAP NetWeaver based EWM: When a plant location is created in SAP EWM by transfer using the core interface (CIF), the system automatically creates an SCU with identical general and address data and the business character *Planning Location*. Conversely, if you manually create an SCU with the business character *Planning Location*, the system automatically creates a location with identical general and address data. If, however, you create an SCU only with the business character *Warehouse*, and a planning location is not assigned, the system does not create a corresponding location.

Hint:
Each warehouse number requires a **unique** supply chain unit. In an environment where several warehouses exist at one physical location (represented by the plant), it is necessary to create additional SCUs manually in the SAP EWM system.

One plant = one location created through CIF = one supply chain unit = one warehouse number that uses that SCU.

In an embedded EWM or decentralized EWM based on SAP S/4HANA, the SCU for the warehouse is always created manually.

Independently of the way the SCU was created, you have to assign the business attribute *Warehouse* manually.

Once you have entered any product master data or document data for a warehouse, do not change the assignment of the SCU to the warehouse number as doing so can cause errors.

Custodian

Each warehouse number also requires the assignment to a business partner that represents the **custodian**. A custodian stores, manages, or further processes stock for another business partner without transfer of title. The custodian only maintains effective possession of the stock, whereas the **owner** maintains legal possession. The holder of stock inventory must not be confused with its owner.

In a scenario where a company has its own warehouse, the custodian is the business partner that represents the plant, which will also probably be the owner of the stock. The custodian does not have to be unique, so if there are several warehouses belonging to one plant, they can all use the same business partner as custodian.

There are three business partners which are important in warehouse settings and operations.

- Custodian
  - Is a warehouse attribute
  - Required for the creation of the warehouse, but no operative function
  - Has the physical access to the products, but is not the owner
- Owner
  - Part of the stock information
  - Is a plant (represented by a business partner) or external vendor (in case of vendor consignment stock) who is the legal owner of the products
- Party Entitled to Dispose
  - Part of the stock information
  - Plant (represented by a business partner) which is entitled to use the stock

Storage Type

A storage type is a four-character code that can represent a variety of physical and logical areas within and outside the physical warehouse. The storage type is a physical or logical subdivision of a warehouse complex, which is characterized by its warehouse technologies, space required, organizational form, or function. A storage type consists of one or more storage sections and bins. The use of the storage type within the warehouse is indicated by the **role** code in storage type Customizing. The storage type can be used in the following roles:

- Standard storage type

  A standard storage type represents a physical area in the warehouse where products are stored according to a set of spatial and material handling strategies. SAP has preconfigured a number of standard storage types for different putaway rules.

- Identification point (ID)

  In the ID role, a storage type can be used to represent an area within a warehouse where goods are labeled, identified, or checked during a goods receipt process. ID points are commonly used with automated storage/retrieval systems.

- Pick point

  A pick point is a physical area within the warehouse where goods are checked, labeled, inspected, or packed during a goods issue process.

- Identification and pick point

  A storage type with the identification and pick point role represents an area within a warehouse where both ID and pick point processing takes place.

- Staging area group

  In this role, a storage type represents one or more material staging areas in the warehouse.

- Work center

  A storage type with the Work Center role represents a physical area within the warehouse where certain processes take place such as deconsolidation, inspection, packing, or value-added-service processing.

- Doors

  This role is used to represent one or more doors in a certain physical location within a warehouse, for example, the doors on the west side of the warehouse.

- Yard

  In this role, a storage type represents a yard adjacent to the warehouse.

- Material flow control

  A storage type with a material flow control role represents an area or system using storage/retrieval automation, such as a conveyor system.

- Work center in staging areas group

  This role is assigned to a storage type to represent a work center within a material staging area. This is for example used in the kit-to-stock process.

- Automatic warehouse (controlled by MFS)

  The automatic warehouse role is used for automatic high rack storage areas controlled through EWM-MFS. The material flow system (MFS) allows you to connect an automatic warehouse to SAP EWM without the need for an additional warehouse control unit.

- Production supply

  The production supply role represents storage bins that are assigned to a production supply area (PSA), and used for material staging.

The control indicators in the storage type Customizing area determine the placement, storage, and removal procedures of product quantities assigned to the storage type.

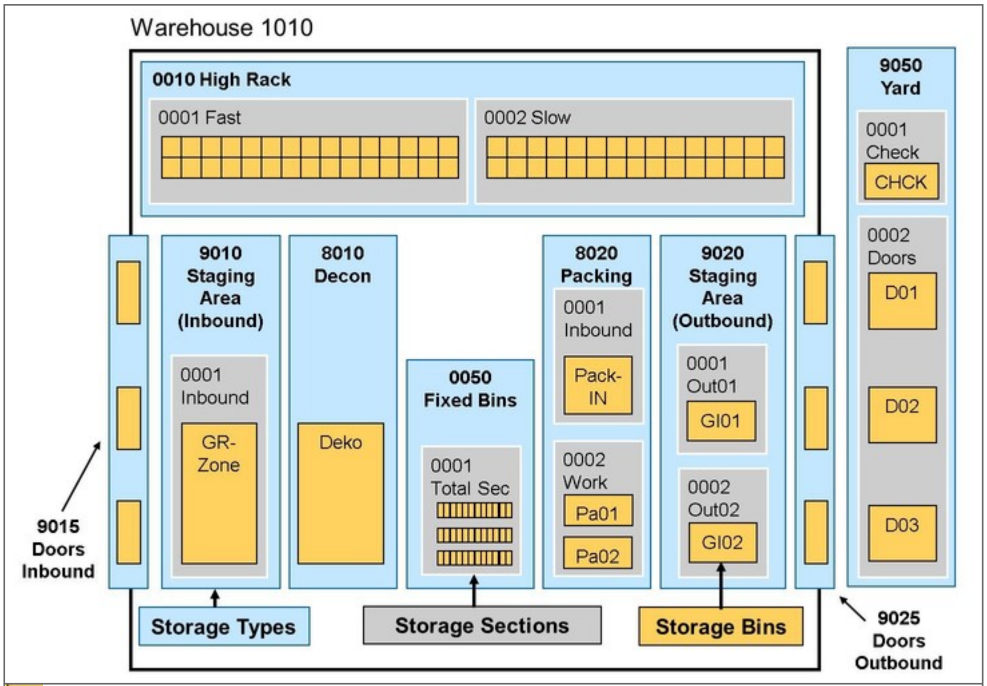


Figure 21: Warehouse Layout Example

Storage Section

In SAP EWM, a storage section is an organizational subdivision of a storage type that is represented by a four-character code. Storage sections contain storage bins that have similar attributes for putaway, such as heavy parts, bulky parts, hazardous materials, fast-moving items, or slow-moving items.

You can use storage sections during the determination of the bin for putaway. The definition of storage sections in a standard storage type is only required if you plan to use the storage section search in the storage type. But storage sections are also used in SAP EWM to structure a storage type with roles like Work Center or Yard. Storage sections are required for storage types with the Staging Area Group role. The actual staging area is always a storage section inside such a storage type.

Quant

In the warehouse, a quant refers to the contents of a storage bin. There are default criteria that the SAP EWM system uses in putaways and stock removals to determine the material quantity that forms a quant in a storage bin.

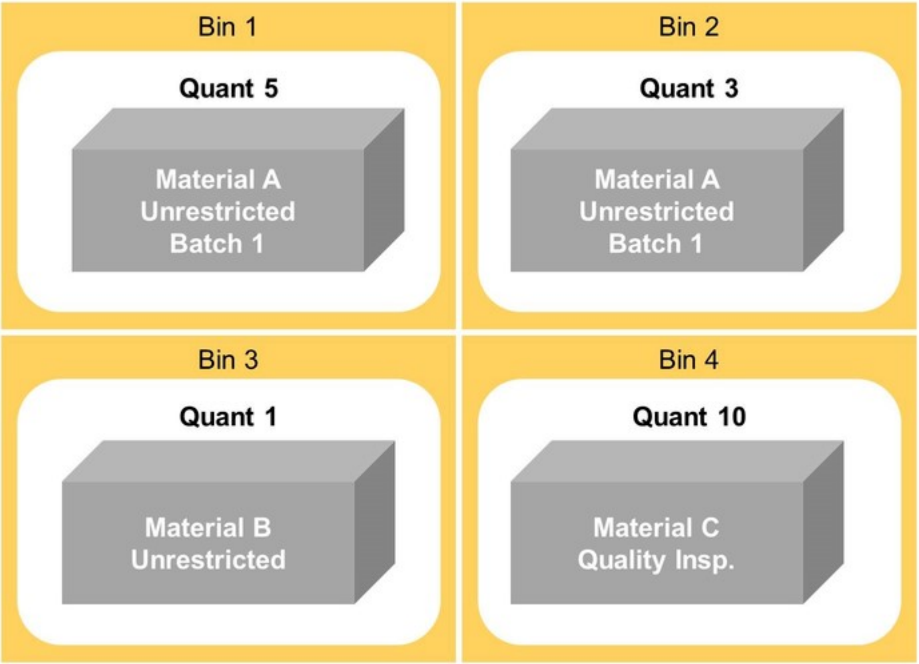


Figure 22: Quant

The default criteria are as follows:

- Material respectively product number
- Stock category
- Special stock assignment
- Plant and storage location which owns the stock
- Batch number (if batch managed)
- Handling unit (if stock is HU-managed in the bin)

The majority of the data in the list comes as information when an inbound delivery is created in SAP EWM. Some information like the batch or the handling unit can also be created during processing in SAP EWM. The stock category can be influenced and changed through quality management processes.

Addition to Existing Stock

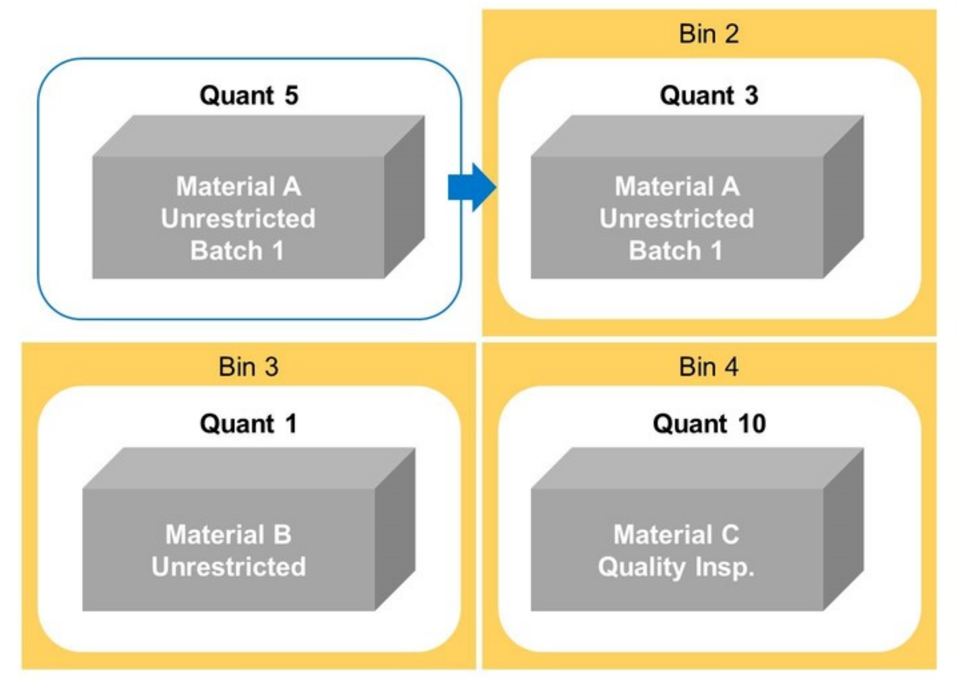


Figure 23: Quant: Addition to Existing Stock

When you allow addition to existing stock, a storage bin that contains a quant of a material can store further quantities of the same material if the remaining quant criteria match. The size of the quant increases and decreases by putaway and stock removal activities.

Note:
The goods receipt date of a material quantity is managed at the quant level. If additions are made to the existing stock, there is only one goods receipt date. Which one prevails can be defined in the storage type settings. But if you want to perform stock removals according to the first in first out (FIFO) principle, you need to prohibit additions to the existing stock.

The same limitation is true for the best-before date (when working without batches).

Addition to stock can be allowed in general in a storage type, but it can also be set to be controlled product specific (with a product putaway profile).

Mixed Storage

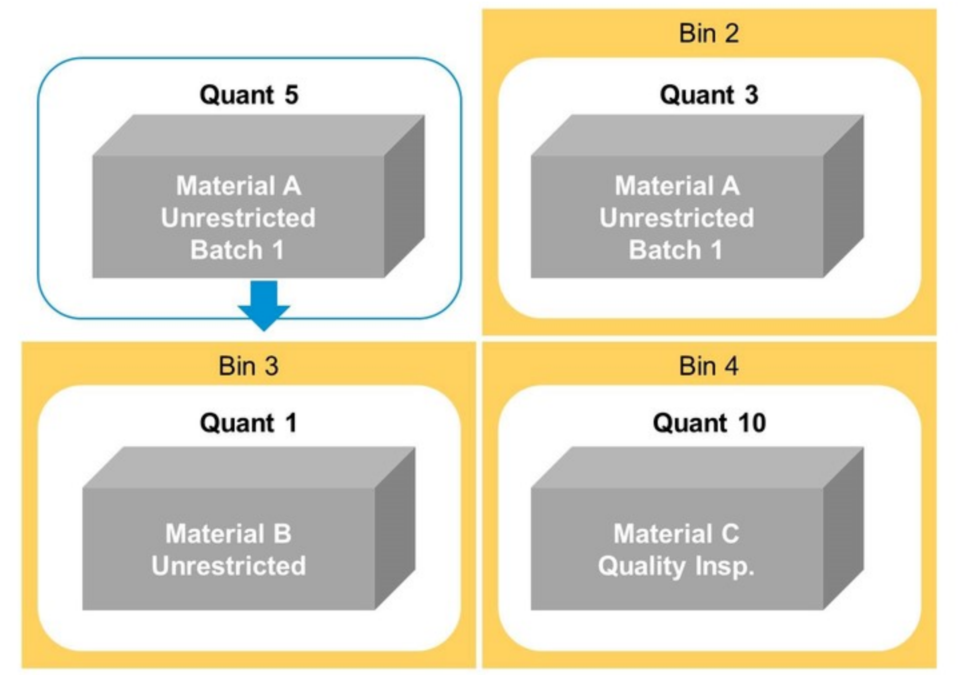


Figure 24: Quant: Mixed Storage

With mixed storage, you can store several materials or several batches of the same material in one storage bin. There are also settings to control the mix of quants inside a handling unit.

Various methods of capacity checks are available depending on the storage type and putaway control. These methods can ensure that the storage bins are not overloaded when additions are made to the existing stock or for mixed storage.

LESSON SUMMARY

You should now be able to:

- Create structural elements in SAP EWM

Unit 3
Lesson 2

Creating Storage Bins

LESSON OVERVIEW

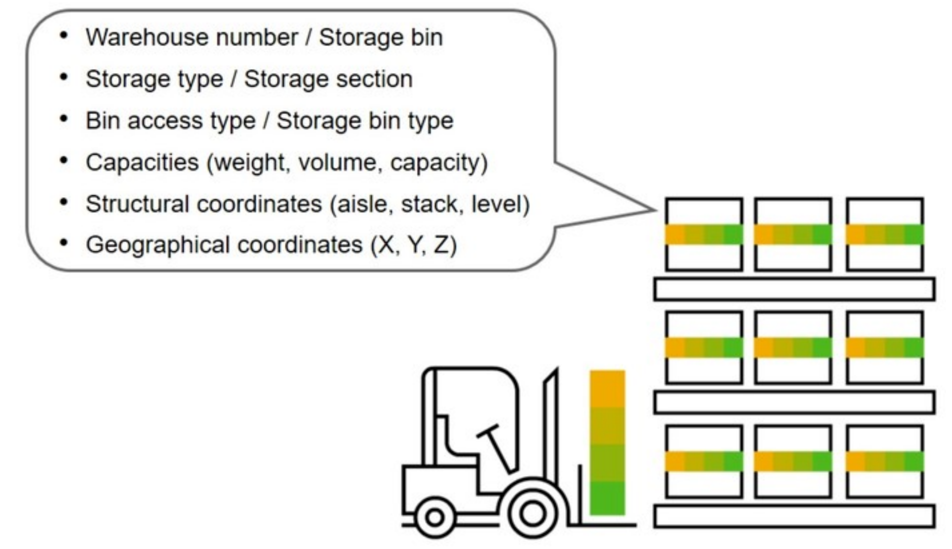
In this lesson, you learn about creating storage bins, the graphical warehouse layout, the display of bins and other objects. You also learn about the activity area and staging areas.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Create storage bins

Storage Bins



- Warehouse number / Storage bin
- Storage type / Storage section
- Bin access type / Storage bin type
- Capacities (weight, volume, capacity)
- Structural coordinates (aisle, stack, level)
- Geographical coordinates (X, Y, Z)

Figure 25: Storage Bin Data

The smallest spatial unit in a physical warehouse is a storage bin. Storage bins represent the exact storage position of a product. A storage bin can be referred to as a coordinate (not to be confused with the geo-coordinate of the bin, which is also available in SAP EWM) because the address of a storage bin is often derived from a coordinate system,. For example, the coordinate 01-02-03 could be a storage bin in aisle 01, stack 02, and level 03. In SAP EWM, the bin coordinate is up to 18 characters in length and must be unique within the warehouse.

Storage bins are located within a storage type. The storage type represents a physical area in the warehouse, and controls how products are placed in and removed from the storage bins assigned to the storage type. The storage type may also be divided into storage sections due to handling and/or storage requirements of the products. Therefore, in SAP EWM, the system represents the location of a product in a warehouse movement as a combination of the storage type, storage section, and bin.

Storage Bin Data

To each storage bin, you assign the warehouse number in which the storage bin is located, and a storage type. Note that the bin coordinate assigned to a storage bin must be **unique within the warehouse**

You can also define the following additional attributes for a storage bin:

- Storage bin type: used to indicate relative size of bin and/or actual bin dimensions
- Storage section
- Bin access type: used to control how the bin is accessed by resources
- Verification: used to store the bin coordinate-related data used in RF scanning or for Pick-by-voice to verify that the correct bin is being accessed
- Geo-coordinates of storage bin: used by SAP EWM to compute distances between the bins in goods movements
- Capacity checking attributes (max weight, volume, total capacity): used to control the amount of product assigned to a bin
- Fire containment section: used in product hazardous material reporting

When you define the attributes for the storage bin, you can use any combination of letters and numbers for storage bin coordinates. However, you should ensure that you align the parts of the structure to the indicators defined for the warehouse for aisle, stack, level, and so on.

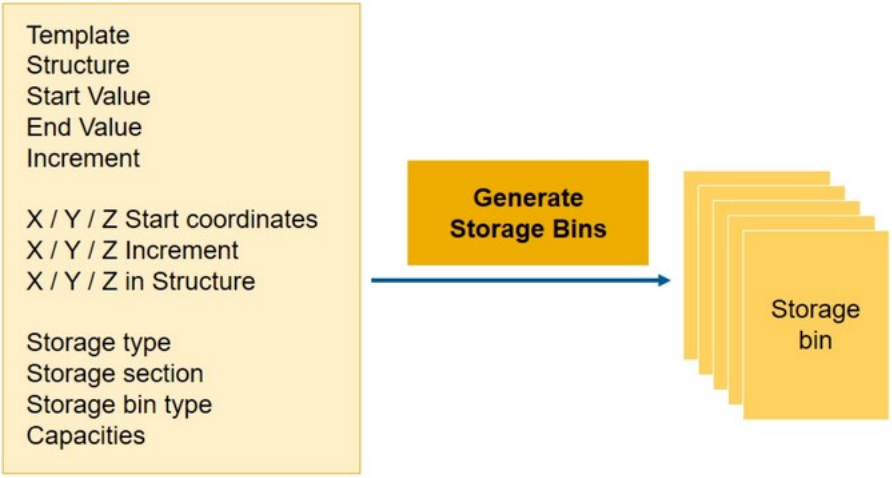
Storage bins can be created in various ways: they can be created individually, generated with the help of a structure, or uploaded with a file.

Storage Bin Generation

In Customizing, you define the storage bin coordinate structure by assigning, first of all, a unique identifier to represent each of the following components of the bin coordinate:

- Aisle
- Stack
- Level
- Bin subdivision
- Bin depth

You then use these identifiers to create a template used to generate the storage bin master record automatically. Only when using the identifiers properly, the aisle / stack / level information in the bin is correctly filed. The storage bin generation structure is shown in the following figure:



Template
Structure
Start Value
End Value
Increment

X / Y / Z Start coordinates
X / Y / Z Increment
X / Y / Z in Structure

Storage type
Storage section
Storage bin type
Capacities

Generate Storage Bins

Storage bin

Figure 26: Storage Bin Generation Structures

With the field *Template* you define which parts of the bin name are:

- N - numeric characters
- A - alphabetic letter
- C - constant characters

> Note:
> Also a space or blank in the bin name is a constant.

The field *Structure* is for the identifiers described above.

Bin x / y / z coordinates

The geo-coordinates of the bins are used to calculate the travel distances of resources and are an important part of the overall time calculation in warehouse orders. Defining the coordinates takes a little bit of effort when doing it for the first time. One thing is important to know for the coordinates as well as for the aisle / stack / level information defined by the identifiers: there are no mass maintenance transactions for these fields, only through the generation of the bins using a template this information is entered automatically correctly. When using the upload function for bins this information can be contained here as well, but especially defining the geo-coordinates is not simpler in a spreadsheet.

The coordinate of the bin is always a **corner** of the bin, the **alignment** describes how the bin is oriented around this corner. In the standard we assume that the coordinate is always the lower left corner of the bin, in that case the alignment is zero.

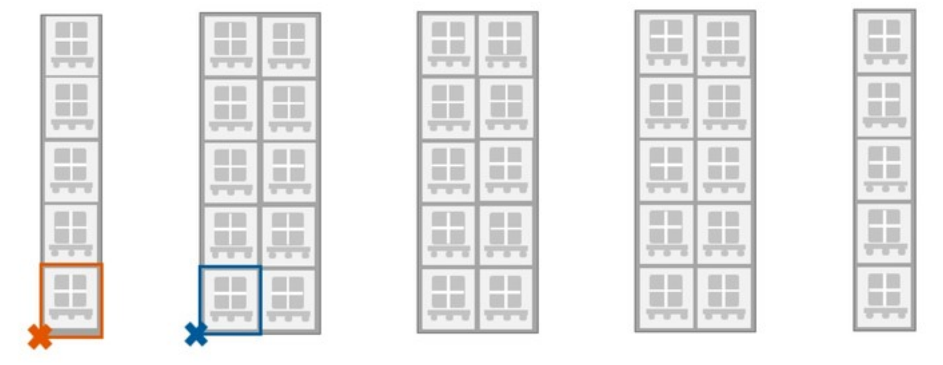


Figure 27: Coordinates for shelf structure

You must also specify which part of the location structure each coordinate relates to, for example whether the aisle is denoted by the X or the Y coordinate. To do so, you use the same identifiers described above for the aisle / stack / level information. This way you define for the system if for example you move by n meters in x direction, if this is the next aisle, or the next stack.

Graphical Warehouse Layout

The graphical warehouse layout (GWL) displays the interior and exterior of the warehouse as a two-dimensional graphic. You can use the graphical warehouse layout to see how the warehouse is customized, check stock levels, or view an overview of the distribution within your warehouse. You might use the GWL, for example, when using travel distance calculation, which is based on the coordinates of the bins.

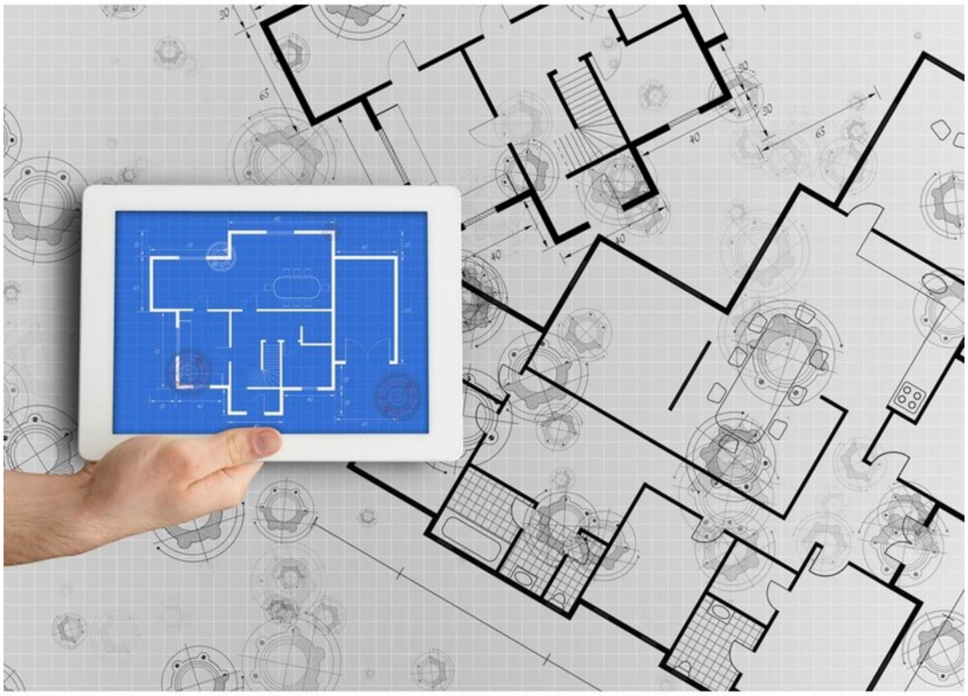


Figure 28: Graphical Warehouse Layout

To view the graphical warehouse layout, you select your warehouse number. To reduce the number of displayed elements, you can also enter storage types or storage type levels.

The unit used for length details in the GWL corresponds to the unit of length that you defined in Customizing for your warehouse number. The display size relates to the largest coordinates that you have defined for a master record. This means you can quickly see, for example, if a rack was defined incorrectly and is located outside the warehouse.

Display of Bins

As an example, let us say that you have created storage bins in Customizing for SAP EWM, and you have defined the template in Customizing in such as way that one side of the aisle contains stacks with even numbers, and the other side of the aisle contains stacks with odd numbers. SAP EWM groups the storage bins that are located on one side of the aisle into racks by default. The graphical warehouse layout can display these racks. To switch to the front view of a rack, click the graphical display of the rack. This means that, even for multi-level racks, all storage bins of one side of the aisle are visible. If you choose **bin level**, EWM displays the individual storage bins instead of the rack in the view from top.

Display of Other Objects

You can create your own warehouse layout objects, such as walls, offices, and so on. You define these objects in Customizing for EWM, and assign them to a GWL object category.

In addition the graphical warehouse layout can show resources (the last location where a resource has made a confirmation), the status of MFS elements, and where you have empty or blocked bins (in a very simple view).

Activity Area

An activity area represents a logical subdivision of the warehouse that groups storage bins based on defined warehouse activities.

Activities

Every movement or process you do in the warehouse has an activity. Examples for activities are:

- Putaway
- Picking
- Physical inventory

You define activities with reference to a *warehouse process category* , which is predefined by SAP. The available warehouse process activities are:

- Putaway
- Stock Removal
- Internal Warehouse Movement
- Physical Inventory
- Posting Change
- Cross-Line Stock Putaway

You can define several activities for the same warehouse process category. For example you define the activities **`Picking`** and **`Express Picking`**, both with reference to the warehouse process category *Stock Removal* . This way you can control movements in the warehouse depending on your requirements.

The activity is read from the *warehouse process type* in the warehouse task, with two exceptions:

- Physical Inventory

  This is directly set through the process of creating a physical inventory document.

- Cross-Line Stock Putaway

  If the system finds an activity area for cross-line stock putaway during the creation of warehouse tasks, it uses this information to influence the determination of the destination bin (depending on the putaway rule).

Activity Areas

With the activity area and the assigned activity you control the size or volume of a warehouse order respectively the area in which a resource will work in the warehouse.

You define activity areas and assign them to storage bins. The assignment can be very broad, just by using the storage type, or more detailed, by using the aisle / stack / level information in the bin. An activity area can include just a small part of a storage type, but it can also stretch over more then one storage type.

In the picture below you see one storage type with several activity areas. The activity area AA0010 is assigned to the complete storage type. It will be used for putaway and for express picking. In addition there are 5 smaller activity areas, which are only used for standard picking. That would mean that for putaway or for express picking resources could go to several bins in the different aisles, each processing one warehouse order. For standard picking one resource would process only tasks which are in the one aisle, while another resource could work in parallel in the same or in another aisle.

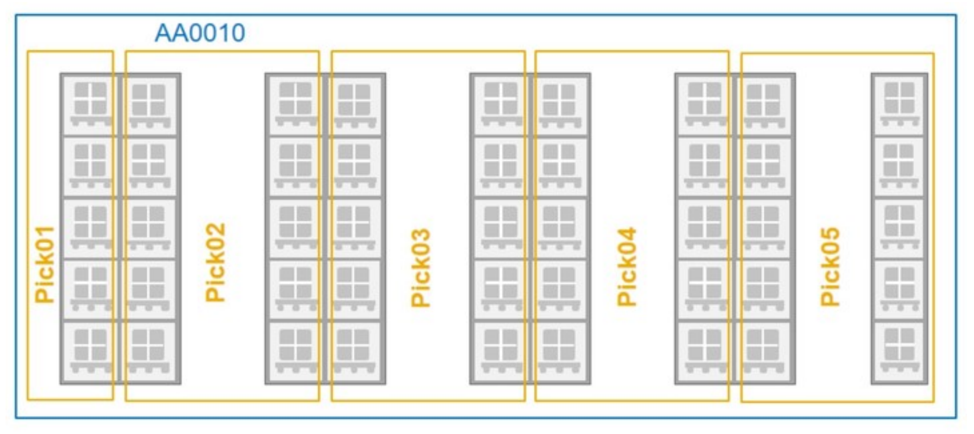


Figure 29: Activity Areas

> Note:
> With the exception of the activity area for physical inventory, no activity areas are needed. But activity areas control the creation of warehouse orders and can also be used for queue determination, so they are very helpful.

Activity Areas and Storage Bin Sorting

In addition to assigning bins to an activity area, you also assign a *bin sorting sequence* for each required activity. This sorting can be used to control the sequence of accessing the bins for a given process such as picking.

> Note:
> You can also define other sort sequences for picking or other activities. This is controlled by the sort profile in the *warehouse order creation rule* . But the sorting according the activity area and activity is nevertheless necessary for the connection of the storage bin to the activity area.

The bin sorting must be performed anytime there is an addition, change, or deletion to the storage bin master data or related activity areas.

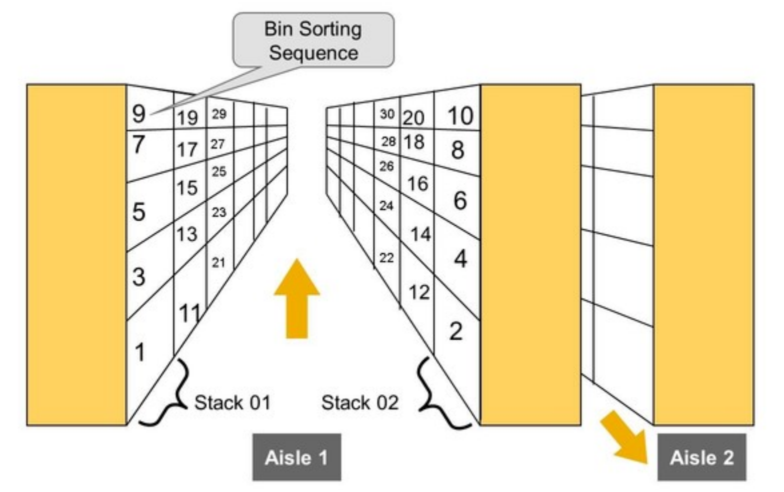


Figure 30: Storage Bin Sorting

Staging Area

Staging areas are used for the interim storage of goods in the warehouse. They are generally located in close proximity to the doors assigned to them. Here the products are stored after unloading or before loading and where usually the goods receipt or goods issue posting is done (“Usually ”means that the GR or GI posting can also happen on other places, for example in a bin assigned to a door on in the truck which is in the yard).

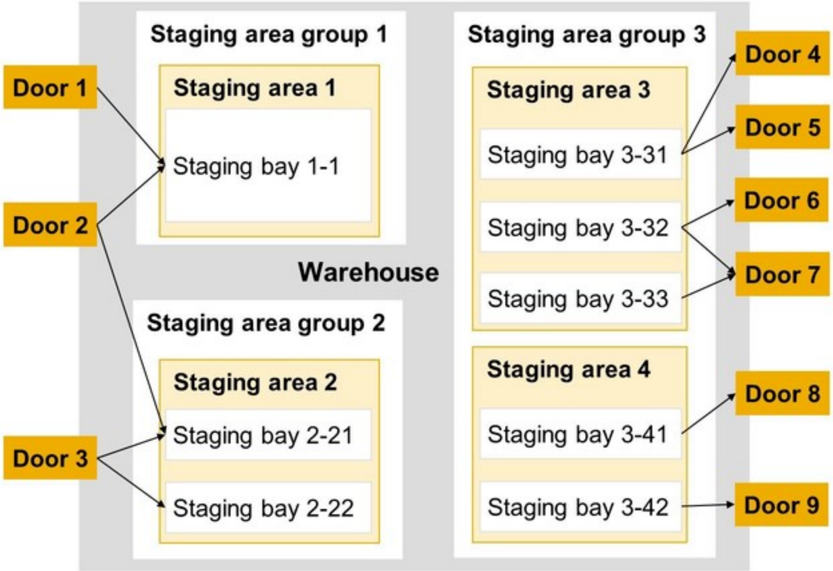


Figure 31: Staging Areas and Doors Example

You can define a staging area to be for goods receipt (GR), goods issue (GI), or both. Note the following:

A staging area is represented in the warehouse structure as a storage section in a storage type with a storage type role of *D - Staging Area Group* . You can have a 1:1 relationship or 1:N (means several storage sections in one storage type). You can also divide each staging area into one or more storage bins. You need multiple storage bins, for example, if you want to define a loading sequence.

In an additional Customizing activity, you "define" the staging area by assigning if the storage section is used for:

- Goods receipt: interim storage of unloaded goods until they are put away
- Goods issue: interim storage of picked goods until they are loaded
- Goods receipt **and** goods issue

LESSON SUMMARY

You should now be able to:

- Create storage bins

Unit 3
Lesson 3

Creating Work Centers

LESSON OVERVIEW

The work center is a physical unit in the warehouse, in which you can perform warehouse activities such as packing, deconsolidation, or weighing. In this lesson you will learn how to create and configure a work center.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Create work centers

Work Centers

A work center is a physical unit in the warehouse in which warehouse activities such as packing, deconsolidation, or weighing are performed. Structurally, the work center is assigned to a storage type and to a storage bin in this storage type. The storage type for the work center must have a storage type role of Work Center (E), Pick Point (B), Identification and Pick Point (C), or Work center in staging area (I). You can configure more than one work center for each storage type in the system. You can give several work centers the same inbound and/or outbound section. To create a work center, you must configure Customizing and master data settings in the SAP EWM system beyond the creation of the storage type that represents the work center.

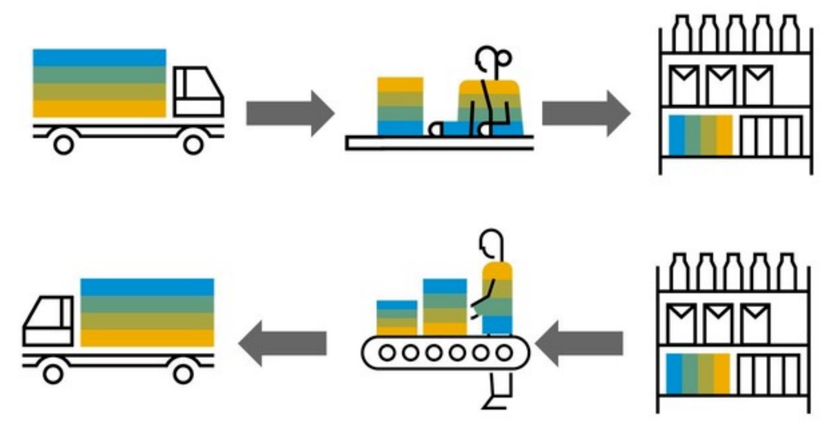


Figure 32: Work Center for Packing

Work Center Processes and Transaction Types

You can use a work center for the following processes or activities:

- Packing

- Deconsolidation
- Counting
- Quality inspection
- Value added services

Which activity can be done in the work center, is controlled by the *Work Center Layout*, which includes a *Transaction Type*. While packing can be done in any work center, other activities like quality inspection or value added services execution can only be done in a work center where the layout has the corresponding transaction type.

The work center layout also controls what areas, tab pages in these areas, and icons are shown on the screen.

Work Center Structure

The following figure shows you an example of how you could structure a work center storage type:

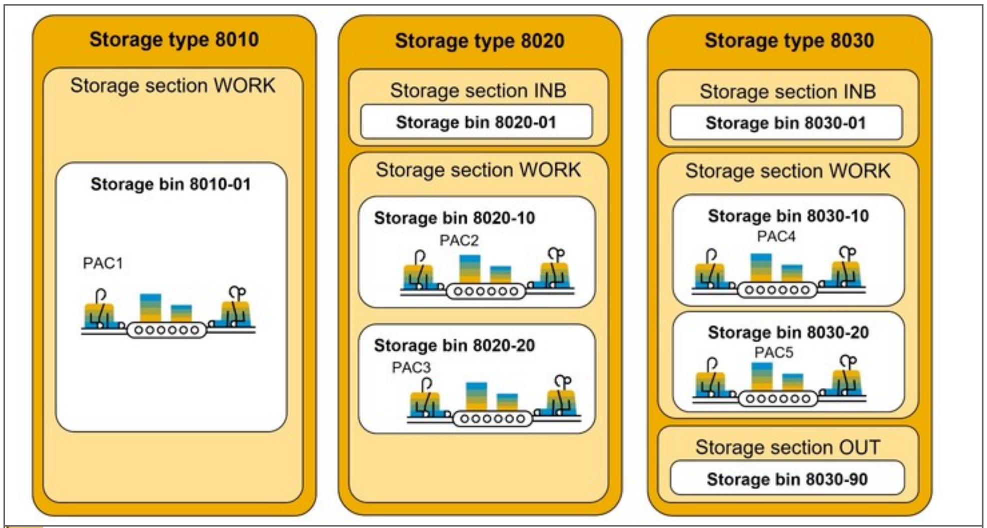


Figure 33: Work Center Examples

Note the following points:

- Work center PAC1 represents a work center that has no inbound section and no outbound section.
- Work centers PAC2 and PAC3 represent work centers that have an inbound section but no outbound section.
- Work centers PAC4 and PAC5 represent work centers that have an inbound section and an outbound section.

An inbound section is used if there is more then one possible work center, but the specific work center can not be determined directly. This is usually the case, as a work center has no *capacity*. That means you can not control how much work is sent to a work center. The work centers share an inbound section, and the system sends the products or HUs into the bin of this inbound section. You then move the HU from the inbound section to the work center using drag and drop at the work center.

The outbound section is helpful when HUs have been processed, but have not been moved to the next storage type. By moving them to the bin in the outbound section, you know that they are not relevant for the work center anymore.

LESSON SUMMARY

You should now be able to:

- Create work centers

Unit 3
Lesson 4

Transferring Master Data from SAP ERP to SAP EWM

LESSON OVERVIEW

This lesson is an brief overview about the different ways which are used to transfer master and organizational data from the SAP ERP system to the EWM system.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Transfer master data from SAP ERP to SAP EWM

Data Transfer Between SAP ERP and SAP EWM

There are 2 kinds of data that are transferred between an SAP ERP system and an decentralized SAP EWM system: master data and transactional data. How master data is transferred depends on the SAP EWM release.

> Note:
> SAP ERP here refers to a SAP Business Suite ERP as well as to a SAP S/4HANA system, connected to an decentralized EWM. In a SAP S/4HANA using embedded EWM a transfer of master data is not required.

There is different master data which can or has to be transferred:

- Location-Related Master Data

  This is divided into:

  - Plants and shipping points

    Plants and shipping points are actually customizing data in ERP.

  - Customers and vendors

- Material Master Data

  Material master related data also includes batches, which are a own set of master data.

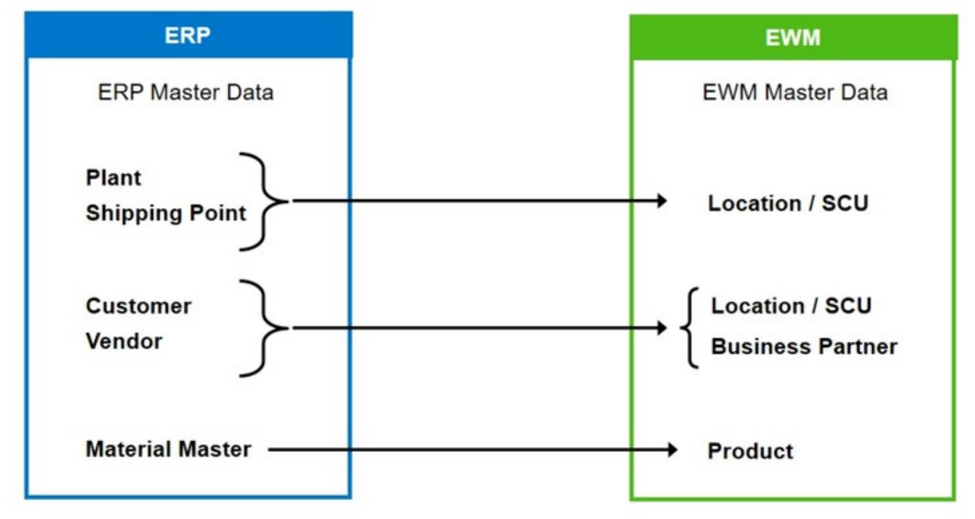


Figure 34: Master Data Distribution

Master Data Transfer up to SAP EWM 9.5

To transfer location and material-relevant master data to a SCM based EWM system, you define a Core Interface (CIF) model in the SAP ERP system. CIF has always been used for the integration between an ERP system and a SCM system, which was the basis for EWM up to release 9.5.

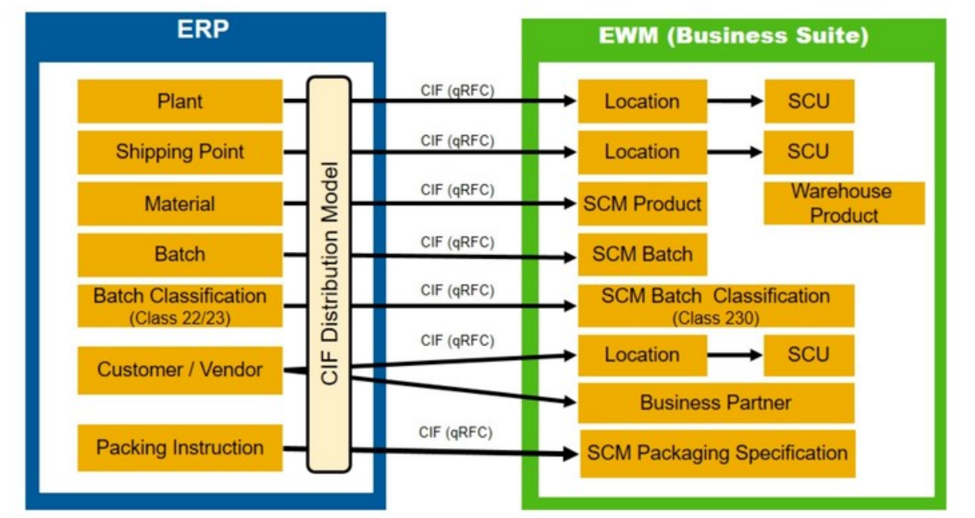


Figure 35: Master Data Distribution up to EWM 9.5

The plant and the shipping points are optional to be transferred via CIF. The plant is required for the creation of the *location product*. The location product itself is not really required for EWM, but it is possible to transfer QM data to the warehouse product (since EWM9.2), and then the location product also needs to be created. The SCU which is automatically created for the location of the plant, can be used as SCU for the warehouse number, but it can also be created manually (see the section about supply chain units in a previous unit).

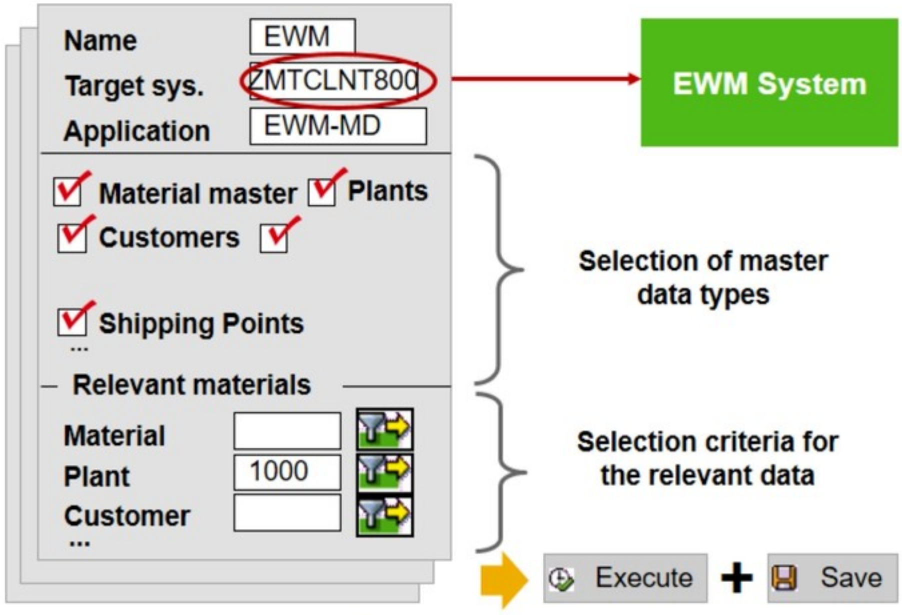
The SCU created for the location for the shipping point can be used to create a SCU hierarchy to model the shipping office and receiving office for a warehouse, but also this can be done differently by simply assigning the business attributes SO and RO to the SCU of the warehouse number.

The warehouse product is an additional segment of the product. It can be created automatically when the product is created through CIF (since EWM9.3), or through slotting, or manually. Details of the warehouse product are discussed later.

For the transfer of customers and vendors through CIF you have to decide if only *locations*, *business partners*, or *both* are created. Business partners are the more important objects for EWM (they have to be created). Locations and the resulting SCUs are used for the route determination in EWM.

The transfer of packing instructions into packaging specifications is not a standard CIF feature, but can be enabled through the implementation of some notes on ERP and EWM side.

The following figure shows the basic information required in the CIF model:



Name: EWM
Target sys.: ZMTCLNT800
Application: EWM-MD

☑ Material master ☑ Plants
☑ Customers ☑
☑ Shipping Points
...

Relevant materials
Material:
Plant: 1000
Customer:
...

EWM System
Selection of master data types
Selection criteria for the relevant data
Execute
+
Save

Figure 36: Generate Integration Model

You identify an integration model using 3 fields of information as shown in the figure: the *Name*, *Target Sys.* and *Application* fields. Within the model you indicate which location and material relevant master data you want to transfer. You indicate to the system the data records you want to transfer by inputting selection criteria.

After the integration model is created, you execute and save it. This process builds an internal file of the selected data. The next step is to **activate** the model. During this step, you transfer the data to the SAP SCM system. After activating the model, any changes to the master data cause the corresponding data fields to update the corresponding data in SAP EWM automatically. This is done by using BTEs (Business Transaction Events).

Master Data in SAP S/4HANA with embedded EWM

In an SAP S/4HANA embedded EWM, the master data is generally **not** transferred from SAP ERP to SAP EWM, but simply shared. It can be enhanced by specific, EWM related data.

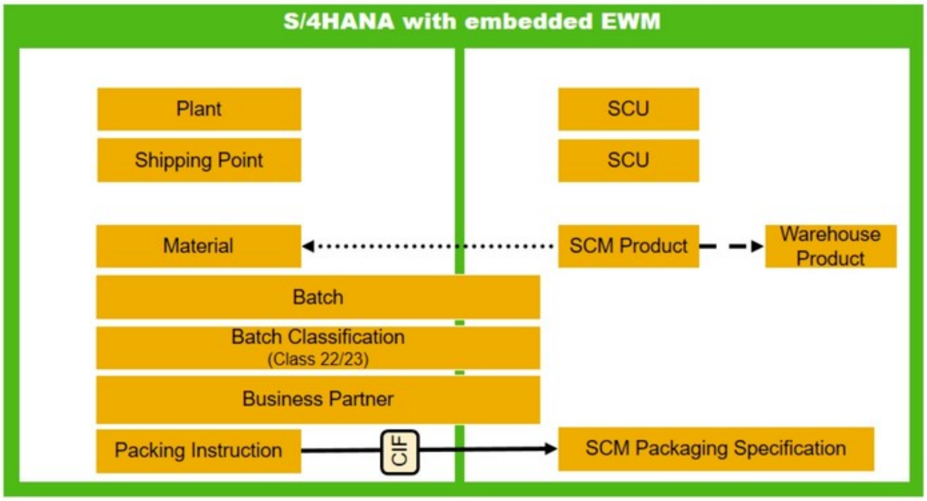


Figure 37: Master Data with SAP S/4HANA embedded EWM

A location product like in a decentralized EWM does not exist in embedded EWM, so there is never a location for the plant. You create the SCUs for the warehouse and the shipping points / receiving points manually depending on your requirements.

For the SCM product, the system just uses the material. The warehouse product is created manually or through slotting.

The transfer of packing instruction to create packaging specifications is possible since S/4HANA 1809 SP03. For this CIF is used inside S/4HANA.

Master Data Transfer to a SAP S/4HANA-based decentralized EWM

If the decentralized EWM system is based on SAP S/4HANA, it is not possible to use the Core Interface for master data transfer from ERP. The reason for that is that the EWM part in S/4HANA again uses the master data in the ERP part of the decentral system, just like an embedded EWM. And the CIF can not create this master data, it can only create SCM based master data.

Because of this the master data is transferred via an ALE distribution model using IDOCs.

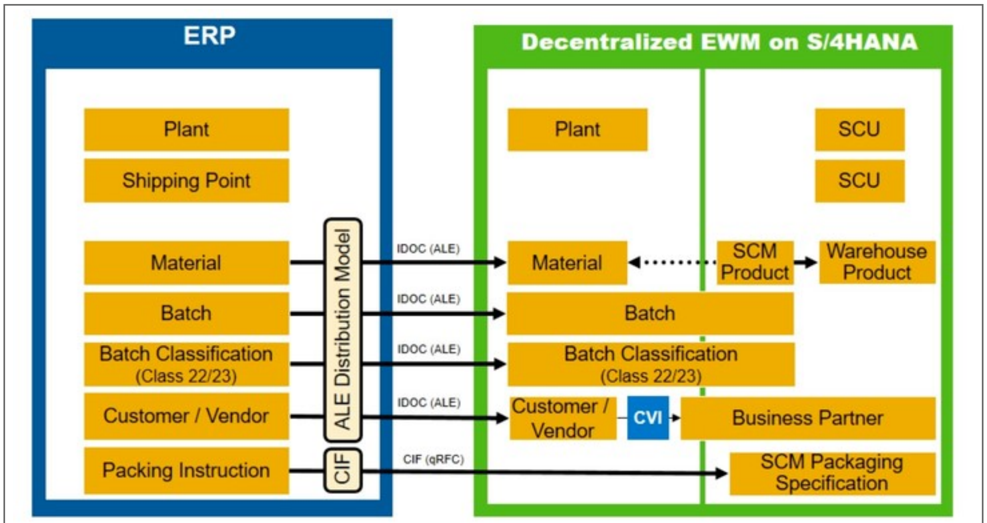


Figure 38: Master Data Distribution with SAP S/4HANA-based decentralized EWM

The plant has to be created in the decentralized EWM as in the ERP system. This is necessary for plant related information in the material or batch. The SCUs for the warehouse and shipping point / receiving point are created manually. You can also use just a single SCU for each warehouse, with the business attributes for warehouse, shipping office, and goods receipt office.

It is not necessary, but possible, to use the Customer/Vendor Integration in ERP, this does not change the master data transfer.

As an exception it is again possible to transfer packaging instructions from ERP via CIF to create packaging specifications in EWM.

Note:
The use of an ALE distribution model and IDOCs is technically not as comfortable as the use of CIF, especially in regards to master data changes. But it is necessary due to the above explained behavior in the SAP S/4HANA EWM, and simply, because this technology exists already for some time. It is planned to replace this type of distribution with a more modern, web-service based technology using the Data Replication Framework.

IDoc Communication for Master Data Distribution

To transfer master data from an ECC or SAP S/4HANA system to a decentralized EWM based on SAP S/4HANA, you use ALE / IDocs.

Note:
We only want to briefly discuss the concepts of master data distribution via ALE in this unit. For a detailed description and a step-by-step instruction you should use the*Integration of SAP ERP or SAP S/4HANA with decentralized EWM in S/4HANA* document. This document is part of the SAP Note “2840129 - Release information and restrictions of Decentralized EWM on S/4HANA 1909 ”

The following master data is distributed via ALE:

- Materials
- Customers
- Vendors and Carriers
- Addresses
- Batches
- Class system: Characteristics master
- Class system: Classes master
- Class system: Classification master

ALE communication with IDocs uses a lot of settings which are anyway required for EWM, like RFC destinations, but instead of a qRFC as we use for delivery documents, IDocs use a tRFC (transactional RFC). Additionally you need to define a port for IDoc processing in the sender system and receiver system, partner profiles, and a distribution model for the different message types. It might be necessary to define some additional filter object types and it might also be required to implement some BAdIs for reducing the master data selection.

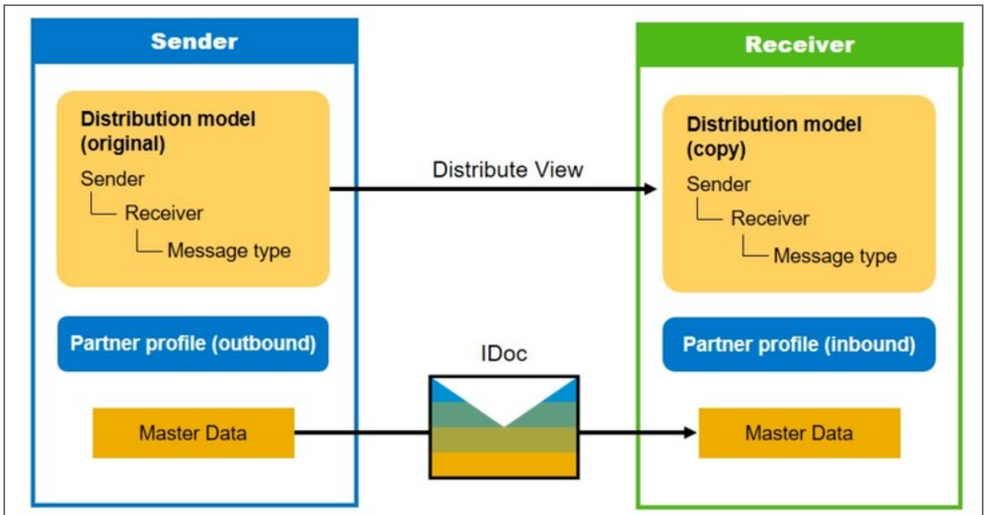


Figure 39: Master Data Distribution with IDocs

Reduced message types

The existing message types for materials (*MATMAS*), customers (*DEBMAS*), and vendors (*CREMAS*) contain several fields which are not required in the decentralized EWM system. Several of these fields also require the maintenance of allowed values for proper distribution. For this reason SAP recommends to define reduced message types for these objects to reduce the maintenance effort and issues with IDoc processing. The *Integration of SAP ERP or SAP S/4HANA with decentralized EWM in S/4HANA* document includes lists of the proposed fields for the reduced messages types.

Initial and delta transfer

The initial master data transfer for the different objects is triggered manually.

- Characteristics with transaction *BD91*
- Classes with transaction *BD92*
- Materials with transaction *BD10*
- Batches with transaction *BD90*
- Customers with transaction *BD12*
- Vendors with transaction *BD14*

After that you use **change pointers**to create IDocs for transferring master data changes. This can be done manually, but it is expected that you automate this by scheduling the program *RBDMIDOC* with variants for the different message types.

> Note:
> "Master data changes" in this context also means master data which is created new. So the transactions for the initial master data transfer are really only required once for a warehouse. They might only be required again when you add for example a plant to a warehouse and need to transfer already existing, but previously not transferred, master data.

SAP EWM actually uses IDoc technology for some time already, for the distribution of transportation information from ERP to EWM and back when you use Transportation Planning (LE-TRA) in ERP.

Accelerate System Integration

S/4HANA 1909 FSP01 offers enhancements for a simpler IDoc integration. Reports are available to:

- Create the reduced message types
- Create the required ALE definitions in the sender and the receiver system

LESSON SUMMARY

You should now be able to:

- Transfer master data from SAP ERP to SAP EWM

Unit 3
Lesson 5

Creating Warehouse Product Master Data

LESSON OVERVIEW

A key element in EWM processing is the EWM specific master data, such as warehouse product master and packing specifications. In this lesson we learn how to create these master data objects and review the major configuration settings related to the EWM master data.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Create warehouse product master data

(Warehouse) Product Master Data

While a standard SAP ERP system works with **material**, the SAP EWM system requires a **product** (a SAP ERP Retail system does not work with materials, but with **articles**, but for EWM that would not make a difference).

In a decentralized system environment you copy each material in the SAP ERP system that is relevant for Extended Warehouse Management to the SAP EWM system using the APO core interface or an ALE distribution model (depending on the SAP EWM release). In an SAP S/4HANA embedded EWM scenario, this is not required, the product is simply created in the background when you create a material.

You can access the product using the *Maintain Product* transaction in the EWM menu, at *Extended Warehouse Management* → *Master Data* → *Product* → *Maintain Product*. Data in the **global data** view of the product is applicable to all warehouses in which the product is stored. The data is organized under the following tabs:

- Properties: contains general information related to the product such as description, weight, volume, grouping codes
- Units of measure
- Packaging data: contains packaging data only for product masters that represent packaging materials
- Storage: contains fields that can control the behavior of the product in all warehouses

Most data in the product comes from SAP ERP, and it should NOT be changed in this transaction, as changes are not transferred back to SAP ERP and are always overwritten if changes are sent from SAP ERP to SAP EWM. To avoid wrong maintenance of the product, customers should use *Transaction Variants* . With a transaction variant you can control which fields on a screen are only displayed, but not changeable. SAP delivers preconfigured transaction variants. For more information, see SAP Note 1451123. For SAP S/4HANA (embedded or decentral) this is not required, the transaction by default is already setup in a way that only relevant fields can be changed.

Fields which have to be maintained in the product are for example the *Product Group Type* and the *Product Group* . This information can not be maintained in ERP.

Warehouse Product

After a product is created in SAP EWM, you can create the warehouse product. The warehouse product is the warehouse number dependent view of the product, and comprises all the properties of a product that relate to its storage in a certain warehouse, such as the putaway and removal control indicators. When you create a warehouse product, all the various indicators on the *Whse Data* tab, along with the slotting data, and storage type replenishment parameters related to a product can be used within the SAP EWM system. You do **not** need to create these views to use a product within the various processes in the SAP EWM system.

You can create, change, or display the warehouse product data using the *Maintain Warehouse Product* transaction on the EWM *Index* screen, at *Extended Warehouse Management* → *Master Data* → *Product* → *Maintain Warehouse Product* . You enter data in the *Warehouse No.* and *Party Entitled to Dispose* fields, because the warehouse number-dependent data of this product is uniquely defined by the warehouse number and party entitled to dispose.

You can also create, change, and display the warehouse product in the Warehouse Management Monitor.

The warehouse product also shows data which is global and transferred from SAP ERP, and therefore should not be changed in SAP EWM. Similar to the product transaction, for the maintenance of the warehouse product a transaction variant is available. For more information, see SAP Note 1451123. And similar to the product transaction, in a S/4HANA system the fields coming from ERP are already not changeable.

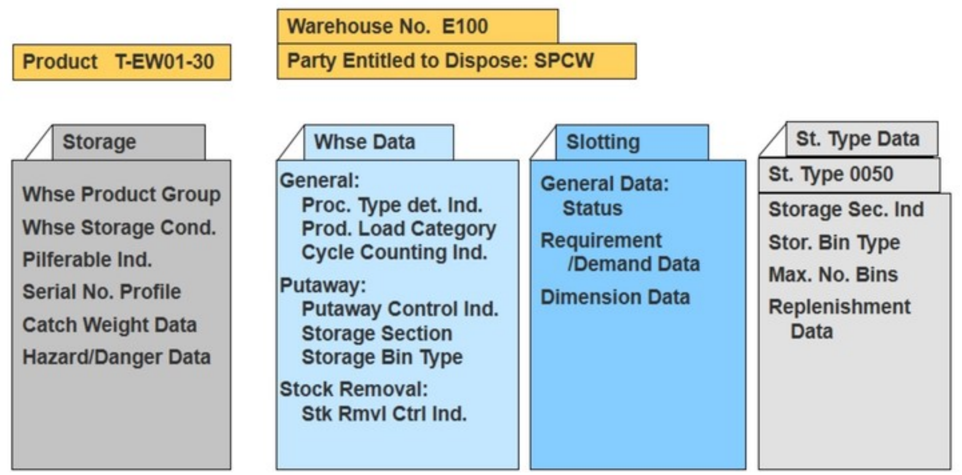


Figure 40: Warehouse Product Master Data Tabs

Since SAP EWM 9.2, it is also possible to activate the automatic creation of a warehouse product when the material is transferred with CIF from SAP ERP to SAP EWM. This switch is available in the warehouse number controls. The automatic warehouse product creation is not available because in SAP S/4HANA embedded EWM or decentralized EWM the materials are not transferred using CIF.

Storage Data

You see global, warehouse number-independent data related to the storage of the product on the *Storage* tab. The *Storage* tab is also displayed in product maintenance.

Note:
Not all fields on the tab **Storage** have a direct impact on warehouse processes, but can be used for **slotting**

In a standard SAP ERP system, most of the fields visible on the storage tab are not visible in the material in ERP, as they have no relevance in ERP. To make the maintainable, you have to configure the material master accordingly. For details see SAP Note 1304710 - Material Master: Add. fields on client level for SPM. In SAP S/4HANA this is not required.

Warehouse Data, Slotting, and Storage Type Data

The warehouse number-dependent data on the warehouse product is found on the *Whse data*, *Slotting*, and *St. type* tabs in the maintenance function for warehouse products as follows:

- Warehouse data

  On this tab, you maintain data for the warehouse in which the product is stored. In this view, there are a number of indicator fields that are used in storage type and storage section determination during the putaway and picking processes.

- Slotting

  On this tab, you have parameters that are used in the slotting and rearrangement processes.

- Storage type data

  On this tab, you maintain data that is specific to a particular storage type in which a product can be stored. This data generally consists of indicators used in replenishment and storage bin management.

LESSON SUMMARY

You should now be able to:

- Create warehouse product master data

Unit 3
Lesson 6

Creating Packaging Specifications

LESSON OVERVIEW

You configure packing specifications to set the necessary packaging attributes, packaging materials, packaging instructions, quantity, and other settings defined for the correct packaging of a product. In this lesson you learn how to create a new packaging specification, how to display a packaging specification that was created, and how to set up packaging specification determination.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Create packaging specifications

Packaging Specifications

Within SAP EWM, you can define packaging specifications for various processes:

- Palletization determination
- Packing in the work center (packing station or deconsolidation)
- Automatic packing in inbound delivery processing
- Packing during warehouse task confirmation
- Deconsolidation using the RF framework
- Value added services (VAS) processing (where a packaging specification is the basis for the VAS order to define the work tasks to be done)

You can use packaging specifications to specify how products are palletized, that is, how the material quantity is assigned to storage bins during the putaway process. As an example, let's say that in your warehouse, you want to put away product A onto pallets that can each contain 50 items. To configure this, you create a packaging specification with a level of 50 for the main packaging material, pallet, and the contents, Product A. In the goods receipt processing stage of the inbound delivery, the system splits the quantity in the inbound delivery across multiple warehouse tasks to adhere to this packaging specification. For example, if a quantity of 100 pieces is delivered, the system creates two warehouse tasks for 50 pieces each.

Packaging Specification Structure

In EWM master data, the packaging specification defines all the necessary packing levels for a product and the related packaging materials and work steps. The following figure illustrates the overall structure of a packaging specification:

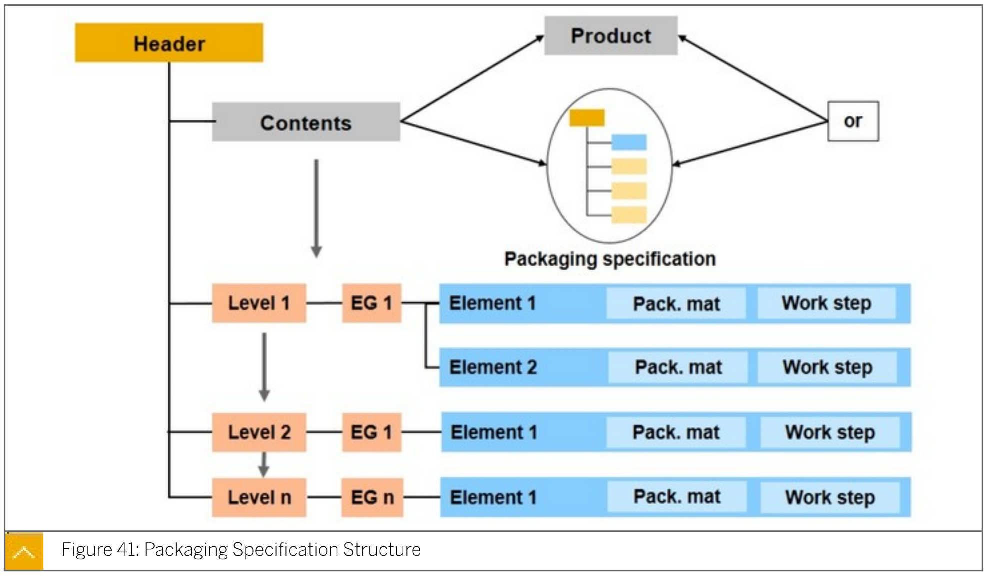


Figure 41: Packaging Specification Structure

A packaging instruction consists of the following structural components:

- Header

  The header contains the name of the packaging specification, the user who created it, and the packaging status.

- Contents

  The contents component contains either the product to be packed or the name of another packaging specification.

- Level

  A packaging specification can contain one or more levels. The level component contains the instructions for packing a previous level, or for Level 1, the content packing in this level.

- Element group

  Each level has exactly one element group. The element group consists of one or more elements. Element groups can also be reused in multiple packaging specifications.

- Element

  An element defines either a packaging material and/or a work step. You pack products in or on a packaging material. You define the packaging material along with the packing characteristics and limits such as maximum packing weight and/or volume, in the product master.

  When using an element as a work step, you enter text to describe how the packing is to be performed. The text is given a code so it can be re-used in other packaging specifications.

Packaging Specifications in SCM Applications

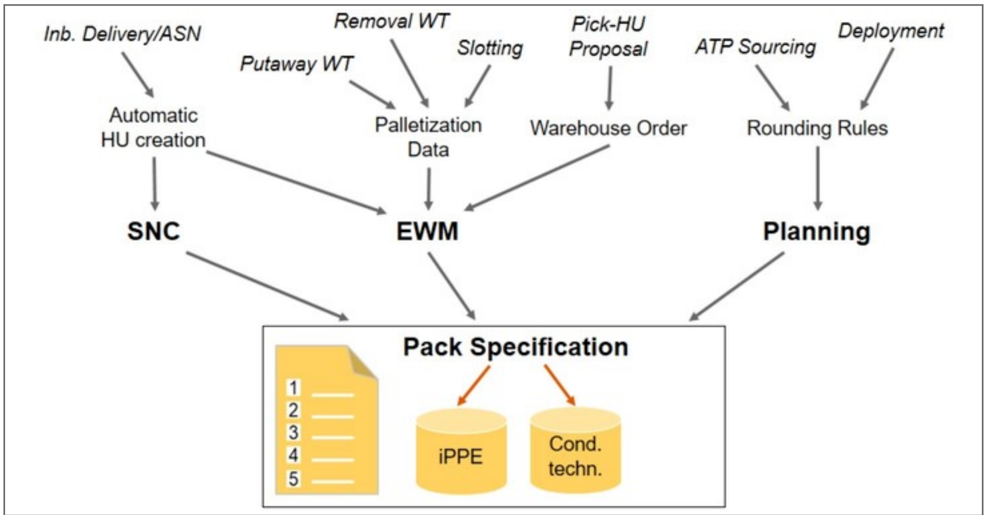


Figure 42: Processes Where Packaging Specifications are Used

Packaging specifications can be used in several SCM applications. The figure shows these applications and how packaging specifications are used within the application. Internally, the packaging specifications use the integrated Product and Process Engineering (iPPE) database engine to store the packaging specifications. This uses the condition technique to determine when a packaging specification is to be applied.

You can maintain packaging specifications centrally and then distribute these packaging specifications to the other systems using the qRFC method, so you are able to work with the same master data in all systems.

Packaging specifications can also be defined in a text file and uploaded to the system. In case of existing packaging instructions in SAP ERP, these can also be transferred to SAP EWM via the Core Interface (CIF) after the implementation of some notes in the SAP ERP and SAP EWM system. For more information, see the following:

- SAP Note 2229816 (SCM: Prerequisite Note for Packaging Specification Transfer)
- SAP Note 2260173 (Transfer of packaging specifications from ERP to EWM system)
- SAP Note 2276668 (Prerequisite note for CIF transfer of Packaging Specifications)
- SAP Note 2260234 (Packing instruction/specification distribution from ECC to EWM)

The distribution via CIF is also available for embedded EWM in S/4HANA.

Packaging Specification Determination

The following processes in SAP EWM use packaging specification determination:

- Automatic packing in the inbound delivery in goods receipt processing
- Packaging material determination for the Pick HU during warehouse order creation
- Packaging material determination during outbound delivery processing in the goods issue process

- Packaging material determination during deconsolidation
- Slotting
- Internal warehouse processes
- Palletization
- Cartonization planning

A great deal of flexibility is available for determining packaging specifications when you use the condition technique. What needs to be considered although, is which information is available at the moment when the system tries to determine a packaging specification. For example: during the creation of a Pick HU in the warehouse order creation process, the ship-to is not known in the standard. Because this is no information which is part of the warehouse task. The field documentation where the determination procedure to be used is assigned to the process, describes which standard fields are available. There is also a BAdI available to enhance the determination.

The basic configuration of the condition technique used to determine packaging specifications is illustrated in the following figure:

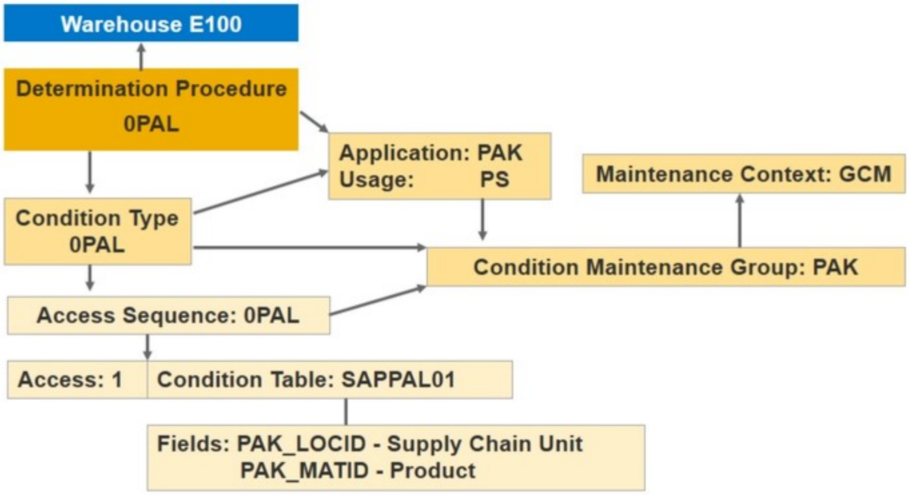


Figure 43: Packaging Specification Determination

Defining a Packaging Specification Determination Application

To define a packaging specification determination application, you create a **determination procedure**.

In the example in the figure, the illustrated procedure is 0PAL, which contains a single **condition type**, 0PAL. This procedure is supplied in the standard system for determining packaging specifications for palletization. The condition type is the link to the **access sequence**, 0PAL. In the condition technique, the access sequence contains one or more **accesses**.

Each access is a **condition table**that contains the fields representing the key to a particular packaging specification. In the standard system, the condition table SAPPAL0 contains a key consisting of the following fields: supply chain unit and product. With this key, packaging specifications are determined based on the supply chain unit and the product number.

In the standard SAP EWM system, you assign all of condition types and condition tables to a **condition maintenance group** PAK. SAP provides a generalized maintenance procedure in the **maintenance context** GCM.

All packaging specification objects, such as determination procedures or condition types, are assigned a **usage** code of PS, which tells the SAP EWM system that the objects are used in packaging specification determination, and an **application** code of PAK.

LESSON SUMMARY

You should now be able to:

- Create packaging specifications

In the standard SAP EWM system, you assign all of condition types and condition tables to a **condition maintenance group** PAK. SAP provides a generalized maintenance procedure in the **maintenance context** GCM.

All packaging specification objects, such as determination procedures or condition types, are assigned a **usage** code of PS, which tells the SAP EWM system that the objects are used in packaging specification determination, and an **application** code of PAK.

LESSON SUMMARY

You should now be able to:

- Create packaging specifications

Unit 3

Learning Assessment

1. The storage section is the smallest spatial unit in a warehouse.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

2. For embedded EWM, the business partner is automatically copied into EWM.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

3. For a decentralized EWM based on SAP S/4HANA, the following master data is distributed via ALE:

   Choose the correct answers.

   ☐ A Materials

   ☐ B Customers

   ☐ C Packing Instructions

   ☐ D Plants

4. A packaging specification consists of a header, a level component, an element group, and which two of the following structural components?

   Choose the correct answers.

   ☐ A Element

   ☐ B Pilferable indicator

   ☐ C Contents

   ☐ D Max no. of bins

Unit 3

Learning Assessment - Answers

1. The storage section is the smallest spatial unit in a warehouse.

   Determine whether this statement is true or false.

   ☐ True

   ☒ False

   That's correct! The storage bin is the smallest spatial unit in a warehouse.

2. For embedded EWM, the business partner is automatically copied into EWM.

   Determine whether this statement is true or false.

   ☐ True

   ☒ False

   That is correct. The business partner is not copied, it simply is also available for the use in embedded EWM without replication.

3. For a decentralized EWM based on SAP S/4HANA, the following master data is distributed via ALE:

   Choose the correct answers.

   ☒ A Materials

   ☒ B Customers

   ☐ C Packing Instructions

   ☐ D Plants

   That is correct. Materials and customers are distributed via ALE. Packing instructions can be distributed via CIF, plants are created manually in the decentralized system.

4. A packaging specification consists of a header, a level component, an element group, and which two of the following structural components?

   Choose the correct answers.

   ☒ A Element

   ☐ B Pilferable indicator

   ☒ C Contents

   ☐ D Max no. of bins

   That's correct! A packaging instruction consists of an element and contents component, as well as a header, a level, and an element group.

UNIT 4

Warehouse Process Types

Lesson 1

Applying Warehouse Process Types 77

UNIT OBJECTIVES

- Apply warehouse process types

Unit 4
Lesson 1

Applying Warehouse Process Types

LESSON OVERVIEW

Warehouse process types control the movements inside the warehouse. In this lesson you will learn the basic settings for these warehouse process types and how the warehouse process type is determined.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Apply warehouse process types

Warehouse Process Types

In SAP Extended Warehouse Management (SAP EWM), the **warehouse process type**(WPT) controls the activity or movement of each process (such as goods receipt, goods issue, posting change) inside the warehouse. A warehouse process type is assigned to every warehouse task document, and has various effects on the creation of warehouse tasks.

For simple movements in the warehouse, the warehouse process type includes the storage type and storage bin from where, or to where, the goods are to be moved. For more complex movements, the warehouse process type either includes the storage process (for process-oriented storage control) or a warehouse order creation rule. The warehouse process type is determined either on item level during the creation of the warehouse request document or by the individual step in the process-oriented storage control.

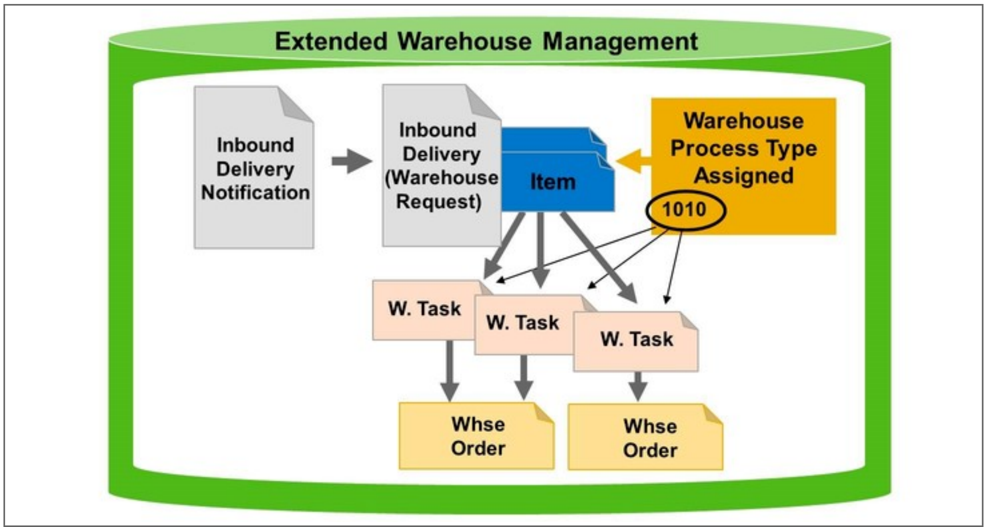

Extended Warehouse Management
Inbound Delivery Notification
Inbound Delivery (Warehouse Request)
Item
Warehouse Process Type Assigned
1010
W. Task
W. Task
W. Task
Whse Order
Whse Order

Figure 44: Warehouse Process Type Assigned To Warehouse Request Item

Warehouse Process Categories

The warehouse process type is assigned to a **warehouse process category**and an **activity**, which are interconnected. The following figure shows the direction of the movement of goods in the warehouse:

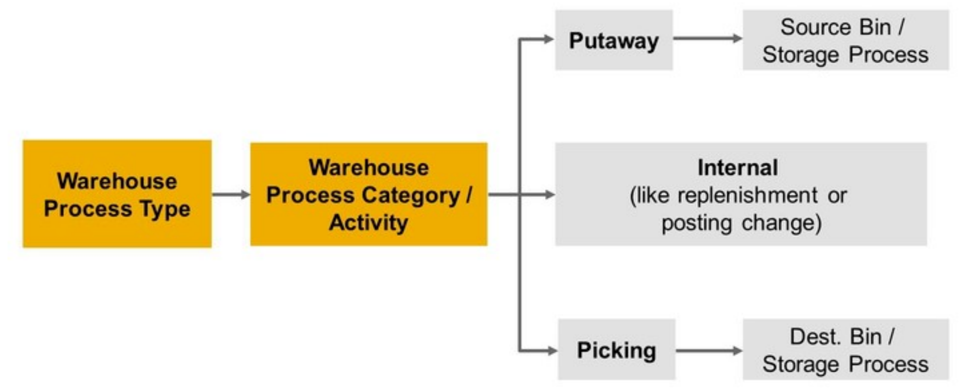

Warehouse Process Type
Warehouse Process Category / Activity
Putaway
Source Bin / Storage Process
Internal
(like replenishment or posting change)
Picking
Dest. Bin / Storage Process

Figure 45: Warehouse Process Type

The warehouse process categories describe the type of the goods movement in the warehouse. The following warehouse process categories are predefined in the standard SAP EWM system:

- Putaway
- Stock removal
- Internal warehouse movement
- Physical inventory
- Goods receipt posting
- Goods issue posting
- Posting change
- Cross-line putaway

The warehouse process categories goods receipt posting and goods issue posting are used internally. Also, physical inventory and cross-line putaway are controlled by the system, so you cannot assign them to a warehouse process type.

Interim Storage Type and Storage Bin

The warehouse process type can include information about the source storage type and storage bin for putaway warehouse tasks, and the destination storage type and storage bin for picking warehouse tasks. Other than in SAP ERP WM, no dynamic storage bins are used in SAP EWM for these interim storage types.

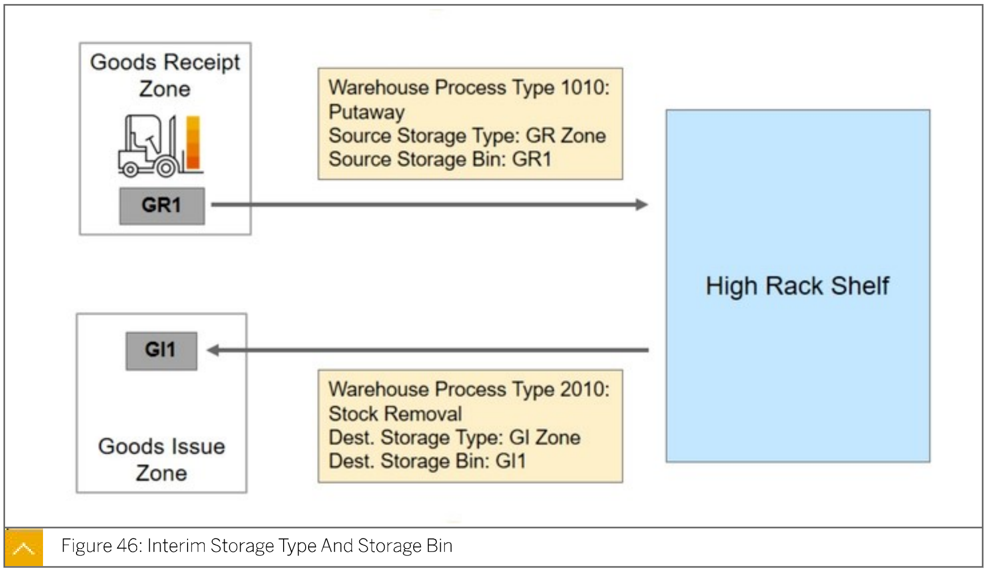


Figure 46: Interim Storage Type And Storage Bin

The warehouse process type does not always include the source or destination storage type and bin. This information can be determined using the complex staging area and door determination. Or, if process-oriented storage control is used, the information is assigned to the storage process itself. Internal movements use strategies or require manual input.

Warehouse Process Type Determination

During the creation of a warehouse request document, the system determines the warehouse process type for each item. For warehouse process type determination, the system uses various data fields such as the document type, the item type, and the control indicator.

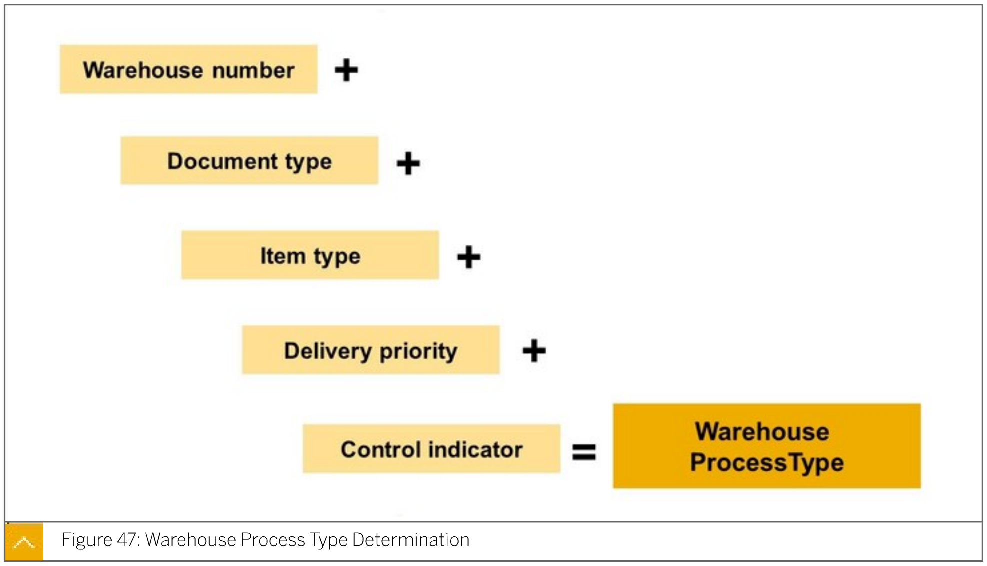


Figure 47: Warehouse Process Type Determination

The system determines the warehouse process type according to the logic outlined in the figure. Not all of the determining fields may be required to determine a particular warehouse process type.

Assumptions for the access logic for warehouse process type determination are as follows:

- The item type is more specific than the document type.
- The delivery priority is more specific than the control indicator from the warehouse product master.
- SAP EWM always takes into account the warehouse number, because process types are defined specifically for each warehouse number.

Determination Process

The system searches through the table trying to find a warehouse process type that satisfies the first requirement in the following list , that is, a WPT for which all the key fields are specified. If no WPT is found, it tries to find an entry for which the document type, item type, and processing type are specified. If no WPT is found, it moves on to the third requirement in the list, and so on. Once a WPT is found, the determination process is complete.

Item Number	Document Type	Item Type	Delivery Priority	Warehouse Process Type Determination Indicator
1	X	X	X	X
2	X	X	X	
3	X	X		X
4	X	X		
5		X	X	X
6		X	X	
7		X		X
8		X		
9	X		X	X
10	X		X	
11	X			X
12	X			

The warehouse process type is also determined in process-oriented storage control and in work center processing. Any time a warehouse task is created, there must be a warehouse process type available from the warehouse request document or from the process configuration.

Control Indicator for Warehouse Process Type Determination

The warehouse process type is determined during the creation of warehouse requests documents (the details are explained above). One of the fields used for the determination is the Process Type Determination Indicator, which comes from the warehouse product (maintained in the *Warehouse Data* view). This allows products to be handled in different ways during goods receipt or goods issue, for example, products that are to be moved immediately into high rack storage can be distinguished from products that need to be processed in some way, such as re-labeling.

LESSON SUMMARY

You should now be able to:

- Apply warehouse process types

Unit 4

Learning Assessment

1. In addition to the warehouse number, what fields are used for warehouse process type determination?

   Choose the correct answers.

   ☐ A Document type
   ☐ B Item type
   ☐ C Delivery priority
   ☐ D Control indicator

Unit 4

Learning Assessment - Answers

1. In addition to the warehouse number, what fields are used for warehouse process type determination?

   Choose the correct answers.

   ☒ A Document type

   ☒ B Item type

   ☒ C Delivery priority

   ☒ D Control indicator

   That's correct! The warehouse number, document type, item type, delivery priority, and control indicator fields are used for warehouse process type determination.

UNIT 5 Goods Receipt

Lesson 1

Outlining Goods Receipt Processes in SAP EWM 86

Lesson 2

Setting Up Availability Groups for Inventory Management (IM) 90

Lesson 3

Configuring Direct Putaway 93

Lesson 4

Applying Putaway Rules 99

Lesson 5

Checking Capacities 111

UNIT OBJECTIVES

- Outline goods receipt processes in SAP EWM
- Set up availability groups for Inventory Management
- Configure direct putaway
- Apply putaway rules and strategies
- Apply the fixed bin putaway strategy
- Apply the general storage putaway strategy
- Apply the addition to existing stock putaway strategy
- Apply the empty storage bin putaway strategy
- Apply the bulk storage putaway strategy
- Apply the pallet storage putaway strategy
- Apply the near fixed picking bin putaway strategy

- Apply the flexible storage behavior
- Describe the various capacity checking methods in EWM

Unit 5
Lesson 1

Outlining Goods Receipt Processes in SAP EWM

LESSON OVERVIEW

This lesson is a basic review of the goods receipt process covered in detail in EWM100, and will help to prepare you for the follow-on lessons detailing the major functions and their configuration in the goods receipt process.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Outline goods receipt processes in SAP EWM

SAP EWM Goods Receipt Process

The figure shows the basic goods receipt process that begins with the creation of an inbound delivery created from the ASN/purchase order in the SAP ERP system:

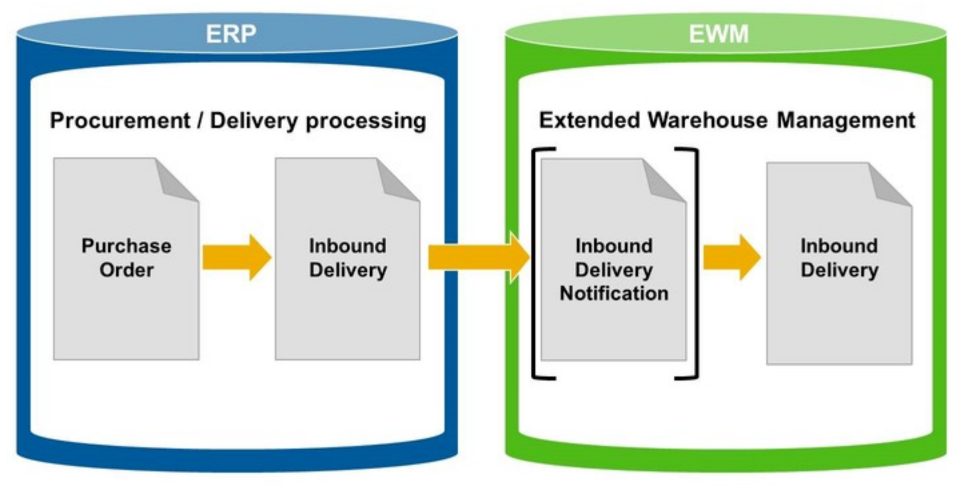

ERP
Procurement / Delivery processing
Purchase Order
Inbound Delivery
EWM
Extended Warehouse Management
Inbound Delivery Notification
Inbound Delivery

Figure 48: Goods Receipt with Inbound Delivery

The inbound delivery is replicated to SAP EWM and becomes an inbound delivery notification (IDN). The IDN is used, for example, to reject the complete inbound delivery (as long as it is not active). The system determines the EWM-specific settings, such as the warehouse process type, and creates the inbound delivery (ID) using the post processing framework (PPF) from the IDN. The initial EWM warehouse tasks are generated from the SAP EWM inbound delivery. From the initial task or tasks, additional tasks may be created in SAP EWM based on process and layout storage control.

Note:
In an SAP S/4HANA embedded EWM, no inbound delivery notification exists. In a decentralized EWM system, the use of the inbound delivery notification is optional since SAP EWM 9.5.

Expected Goods Receipt Process

Another goods receipt process that generates an inbound delivery in SAP EWM is the expected goods receipt process.

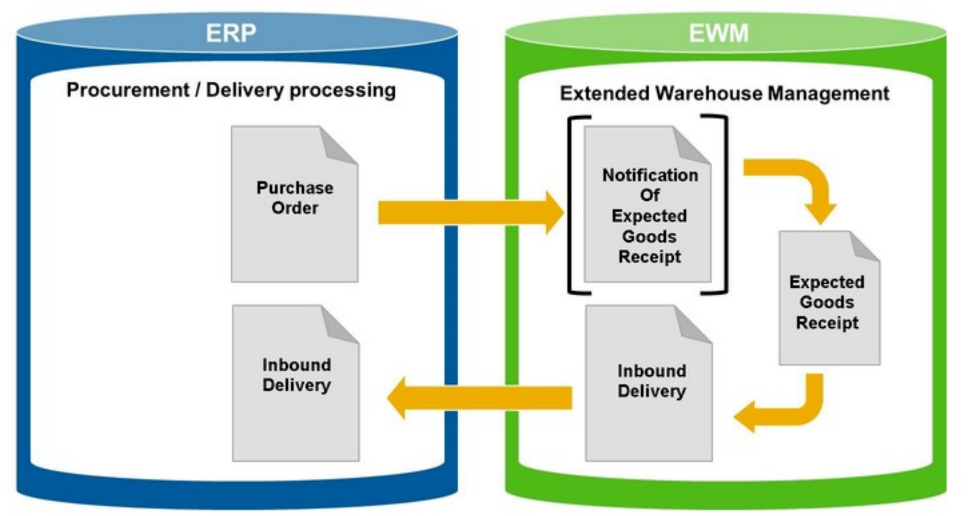

ERP
Procurement / Delivery processing
Purchase Order
Inbound Delivery
EWM
Extended Warehouse Management
Notification Of Expected Goods Receipt
Expected Goods Receipt
Inbound Delivery

Figure 49: Expected Goods Receipt Process

The system creates the notification of expected goods receipt (GRN) with reference to either a purchase order or production order in the SAP ERP system. The creation of the GRN is triggered through a report which is scheduled to run either in SAP ERP or in SAP EWM. The GRN contains a copy of all of the relevant logistics data from the source document. The system creates the expected goods receipt (EGR) from the GRN after it has been activated by SAP EWM.

In the expected goods receipt process, an inbound delivery can be created from an EGR document in SAP EWM. For this process, you enter the preceding document. When you save the document, the inbound delivery is sent to SAP ERP.

Note:
In an SAP S/4HANA embedded EWM, neither the notification of expected goods receipt nor the expected goods receipt document exist, but it is possible to create the inbound delivery directly in SAP EWM with reference to the purchase order (or manufacturing order). In the decentral EWM, the use of the notification of expected goods receipt is optional since SAP EWM 9.5.

There are also Business Add-Ins (BAdIs) in place that allow you to open the transaction `VL60` in SAP ERP and create the inbound delivery there, instead of creating it in SAP EWM.

In the lessons that follow, we cover the configuration of the goods receipt process, exploring functions such as availability groups and location determination in warehouse task processing.

Goods Receipt Posting

The actual goods receipt posting can be triggered in different ways, but it is always done in EWM.

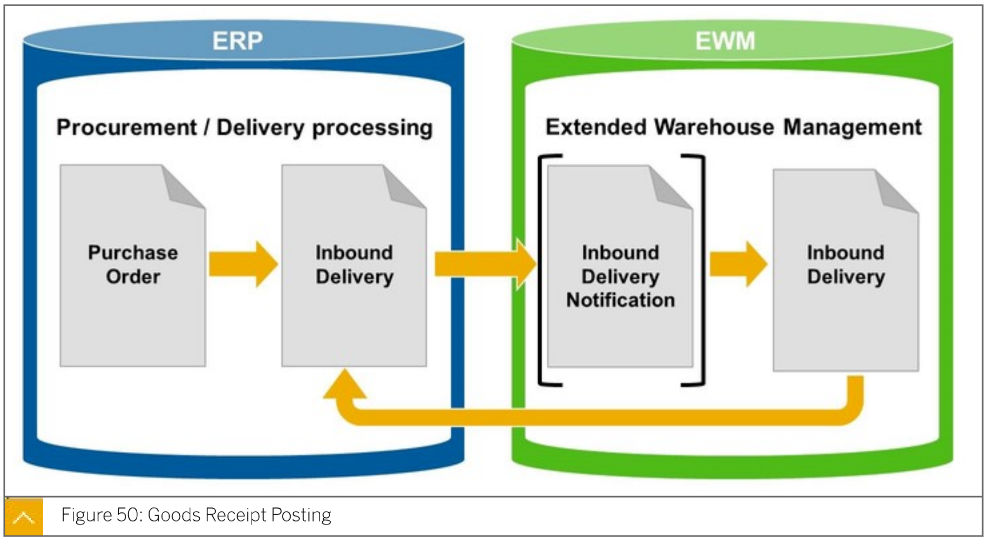

ERP
Procurement / Delivery processing
Purchase Order
Inbound Delivery
EWM
Extended Warehouse Management
Inbound Delivery Notification
Inbound Delivery

Figure 50: Goods Receipt Posting

Explicit Goods Receipt Posting

Explicit goods receipt posting means that you start with the goods receipt posting as first activity in the warehouse. There are various possibilities to do this:

- *Goods Receipt* + *Save* in the inbound delivery.

  You can use the transaction or app for the processing of the inbound delivery to trigger the goods receipt.

- *Physical Goods Receipt*

  This transaction offers possibilities to search for the inbound delivery through all kinds of information, like purchase order or door. You can process each individual item, like change quantities, pack, add information like serial number or batches and mark the item for goods receipt.

- When using the yard, you can post goods receipt for the complete transportation unit content when it has arrived in the yard.

  A transportation unit is for example a truck. The content is the associated inbound deliveries.

The posting of the goods receipt can of course trigger the creation of the warehouse tasks for putaway.

Note:
The automatic creation of the warehouse task in the event of a explicit goods receipt posting does not happen in our system, as we often create warehouse tasks in the foreground to control strategy settings.

Implicit Goods Receipt Posting

Instead of posting the goods receipt as first step in warehouse processing, you can simply create the warehouse task. The confirmation of this warehouse task will automatically trigger the goods receipt posting in EWM and in ERP. But there are some things to consider:

- Confirmation of the warehouse task in a complex scenario: A complex scenario would be for example if there is first a task for unloading, then a warehouse task for a movement to a packaging work center, finally a warehouse task for putaway in the destination bin. The goods receipt posting is done with the confirmation of the **first** warehouse task, so with the unloading step. In case of an ROD/AFS scenario (described in the next lesson) the system would trigger a posting change once the material arrives at the final bin.
- When confirming warehouse tasks with mobile devices, the user confirms task by task. If for example the inbound delivery contains several items or HUs, and each of them is an individual warehouse task, each time such a task is confirmed the goods receipt for the warehouse task content is posted. That leads to a bigger quantity of material documents in the ERP system, especially if that is then again combined with the ROD/AFS scenario (which then eventually doubles the number of material documents).

  You can influence that the goods receipt posting is send back to ERP only when the GR is completely done in EWM or when the putaway is completed. But this means that during this time a stock difference between ERP and EWM exists (the GR posting in EWM is definitely done, this can not be avoided or delayed). The *Goods Receipt Mode* can be set in the *Control Parameters for ERP Version Control* or in the *Process Profile* for the inbound delivery. The process profile option is available because the control parameters for ERP version control option does not exist in embedded EWM.

Note:
With SAP S/4HANA 1909 there is a new option in the document type for inbound deliveries that the creation of the warehouse task is **not** allowed before the goods receipt posting.

LESSON SUMMARY

You should now be able to:

- Outline goods receipt processes in SAP EWM

Unit 5
Lesson 2

Setting Up Availability Groups for Inventory Management (IM)

LESSON OVERVIEW

In this lesson, we explore the use of availability groups and their application to inventory management.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Set up availability groups for Inventory Management

Availability Groups and the SAP ERP IM Interface

SAP EWM does not maintain the SAP ERP plant and storage location in the SAP EWM warehouse quant data. Instead, it uses the SAP EWM availability group to determine an SAP EWM stock type. In SAP EWM Customizing, there is a table that maps the SAP ERP plant, storage location, and logical system number to an availability group. The availability group together with the ERP stock-type is the link between stock types in SAP EWM and the SAP ERP plant and storage location stock.

The following figure illustrates the connection between the SAP ERP IM interface and SAP EWM in the goods receipt process:

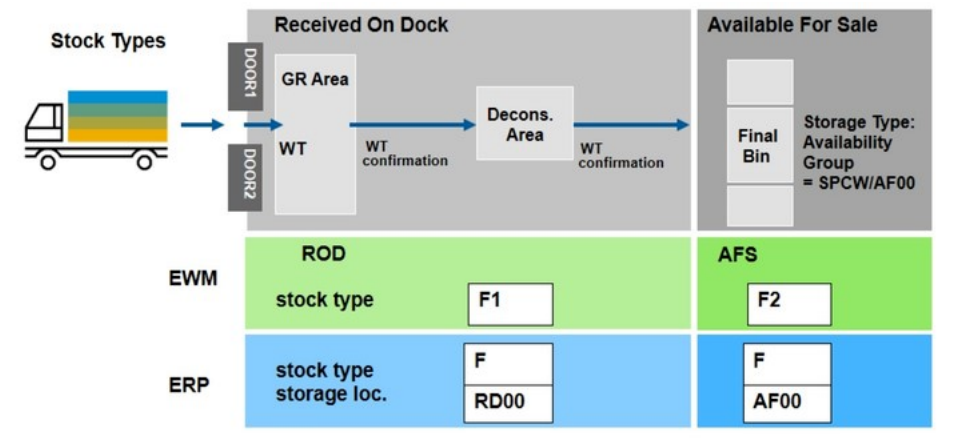


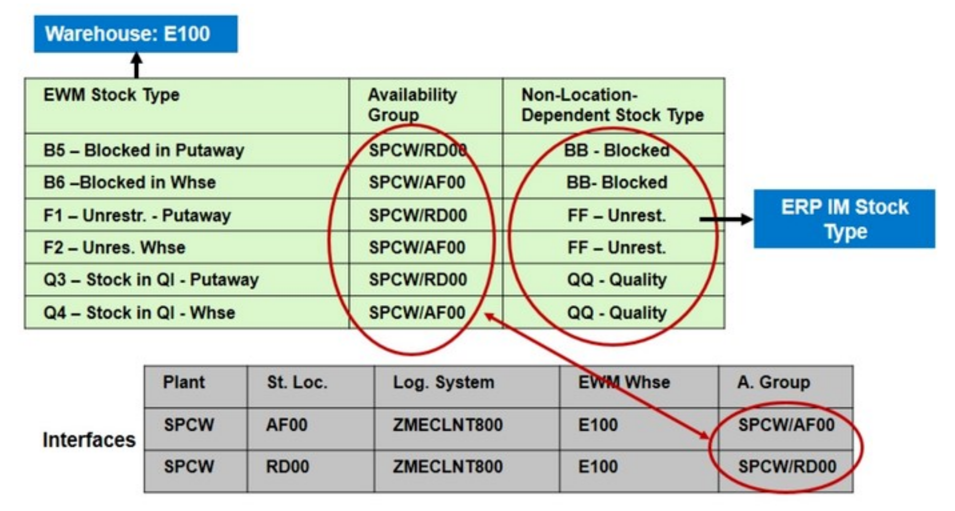
Figure 51: ERP And EWM Availability Group And Stock Type Interface

In the proposed standard EWM settings, the system works with two storage locations in SAP ERP and two corresponding availability groups. The storage location Received on Dock (ROD) shows the situation when the material has arrived, but is still in the inbound processing. After the material has reached the final bin or bins in the warehouse, SAP EWM triggers a posting change to the storage locations Available for Sale (AFS), to show that the inbound process has been completed.

> Note:
> It is not required to work with these two storage locations. If you do not want to distinguish between material which is still on the way to the final bins and stock which is already put away, you can work with just one storage location.

Availability Group Configuration

To establish the availability group interface in SAP EWM and SAP ERP, the system uses Customizing tables. The following figure illustrates the basic settings:



EWM Stock Type	Availability Group	Non-Location-Dependent Stock Type
B5 – Blocked in Putaway	SPCW/RD00	BB - Blocked
B6 –Blocked in Whse	SPCW/AF00	BB- Blocked
F1 – Unrestr. - Putaway	SPCW/RD00	FF – Unrest.
F2 – Unres. Whse	SPCW/AF00	FF – Unrest.
Q3 – Stock in QI - Putaway	SPCW/RD00	QQ - Quality
Q4 – Stock in QI - Whse	SPCW/AF00	QQ - Quality

Plant	St. Loc.	Log. System	EWM Whse	A. Group
SPCW	AF00	ZMECLNT800	E100	SPCW/AF00
SPCW	RD00	ZMECLNT800	E100	SPCW/RD00

Figure 52: Availability Group Configuration

The stock information (for example in the inbound delivery) is always a combination of:

- plant
- storage location
- non-location-dependent stock type

The non-location-dependent stock types correspond to the stock types in ERP.

The combination of plant, storage location, logical system, and warehouse number is assigned to an availability group. The combination of availability group and non-location-dependent stock type is assigned to an EWM stock type.

Note:
Additionally there is a column *Stock Type Role* . The stock type role describes additional stock scenarios. Possible entries are:

- Normal Stock
- Customs Blocked Stock
- Scrapping Stock

With EWM in SAP S/4HANA (embedded or decentralized) improvements for a better visibility of the plant and storage location are available:

- The default text of stock types is defined in the LIME (Logistics Inventory Management Engine). But you can overwrite this text for each warehouse number in the table where the assignment to availability group and non-location-dependent stock type is done.
- The availability group used to be a 4 character field only and was usually named 0001 or 0002. Now the field is longer, so you can use a combination of "plant/storage location" (like SPCW/AF00).

LESSON SUMMARY

You should now be able to:

- Set up availability groups for Inventory Management

Unit 5
Lesson 3

Configuring Direct Putaway

LESSON OVERVIEW

When warehouse tasks are created for the movement of a product from its source receiving bin to a destination bin in the warehouse, SAP EWM determines the destination bin information in several steps. In this lesson, we examine how this process is configured.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Configure direct putaway

Putaway Bin Determination

The SAP EWM system obtains the source storage type and bin from the warehouse process type or from the staging area / door determination. It then determines the destination putaway bin based on storage type, storage section, and putaway strategies. The location information is then copied into the putaway warehouse task. This process is illustrated in the following figure:

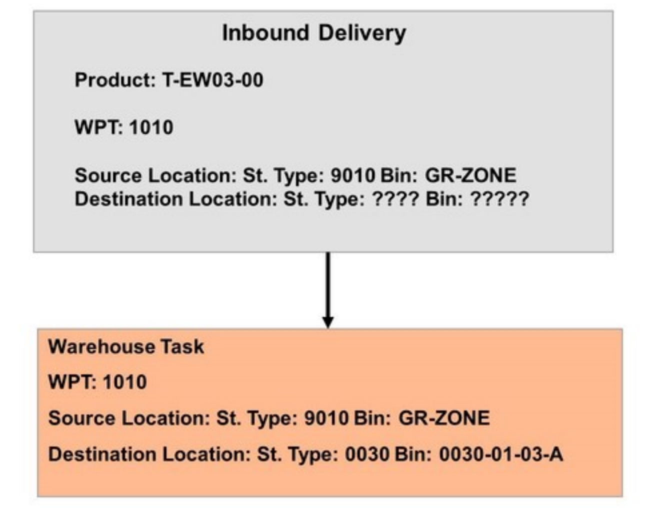

Inbound Delivery
Product: T-EW03-00
WPT: 1010
Source Location: St. Type: 9010 Bin: GR-ZONE
Destination Location: St. Type: ???? Bin: ?????
Warehouse Task
WPT: 1010
Source Location: St. Type: 9010 Bin: GR-ZONE
Destination Location: St. Type: 0030 Bin: 0030-01-03-A

Figure 53: Location Information in the Inbound Delivery and Warehouse Task

During the warehouse task creation for putaway, the system can do several steps to determine the final bin:

- The system uses existing HU information or packaging specifications for palletization for quantity information.
- A storage type search sequence is determined.

- Optional: a storage section search is done.
- Optional: a bin type determination is done.
- The putaway rule for the storage type is used to determine a bin.
- Optional: a capacity check for the bin is triggered.

Storage Type Determination

To determine the destination bin, the system first determines the **destination storage type** To do this, the system obtains information from the inbound delivery document (party entitled to dispose, stock type/usage), warehouse product master (putaway control indicator), hazardous substances master data, and packaging specifications. With this information, the system determines the **storage type search sequence** which contains the list of storage types that can be searched for bins. This process is illustrated in the following figure:

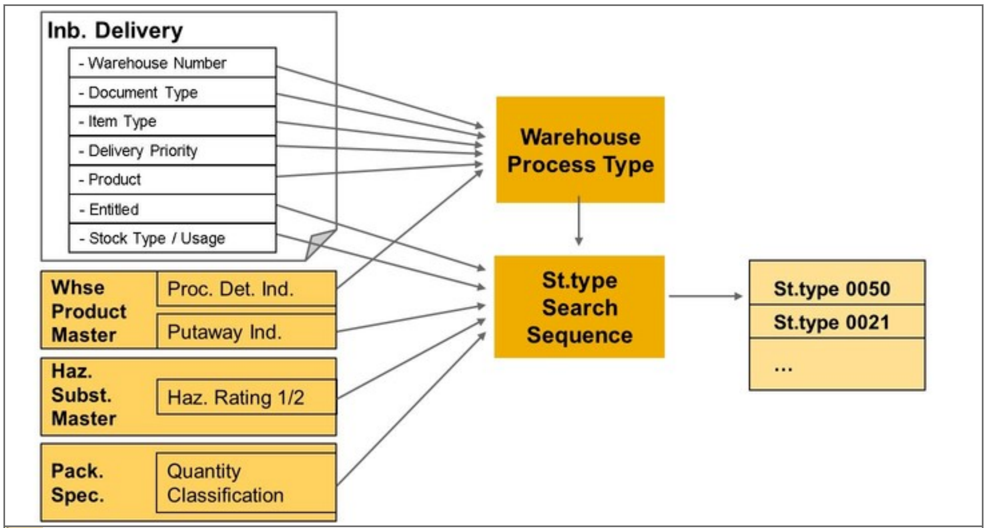


Figure 54: Storage Type Determination

To define the storage type search sequence and to assign the storage types, in Customizing for *SCM Extended Warehouse Management* , choose *Extended Warehouse Management* → *Goods Receipt Process* → *Strategies* → *Storage Type Search* → *Define Storage Type Search Sequence for Putaway* and *Assign Storage Types to Storage Type Search Sequence* .

Storage Type Search Sequence Determination

The system can use several parameters to determine the storage type search sequence.

- Warehouse Number

  This is the only mandatory parameter.

- Putaway Control Indicator

  This indicator is assigned to the warehouse product.

- Warehouse Process Type

  For the warehouse process types you can also define **Groups**. To define groups, in Customizing for *SCM Extended Warehouse Management* , choose *Extended Warehouse*

Management → *Goods Receipt Process* → *Strategies* → *Definition of Groups* → *Define Group for Process Type* . A similar path exists in the customizing for the *Goods Issue Process* . You define the groups in either place and assign them directly in the warehouse process type.

- Quantity Classification

  This comes from a packaging specification or from an alternative unit of measure.

- Stock Type

  Also stock types can be consolidated into groups.

- Type

  Here you can distinguish regular stock from Sales Order Stock or Project Stock.

- Stock Usage

  Special stock usages are for example **Consignment Stock**or **Stock with Subcontractor**

- Party Entitled to Dispose
- Hazard Rating - 1 and 2

When searching for the storage type search sequence, the systems attempts to read a completely qualified entry at first. In other words with all available information from the inbound delivery, the warehouse product, and the dangerous goods master. If no entry is found, the system uses the **Access Strategy**. This access strategy is defined by the customer to control which fields should be used at all for the search and in which sequence the search should be done.

For example: you have an entry using a putaway control indicator and another entry using the warehouse process type. In the first sequence the system would try to find an entry with

- the putaway control indicator (assuming there is one in the warehouse product you want to create the warehouse task for)
- the warehouse process type (which must be in the inbound delivery)
- at least with the stock type and the party entitled to dispose, because definitely this information is available. Any other search information listed above might not be relevant (for example it is no hazardous substance).

In the access strategy optimization you have maintained an entry to search with the putaway control indicator first (which makes sense, as you want to find it product specific) and then with the warehouse process type (which would then be found for products without the putaway control indicator).

Storage Section Determination

In storage section determination, the storage type, storage section indicator from the warehouse product master, and hazardous attributes could be used to determine the storage section sequence. This process is illustrated in the following figure:

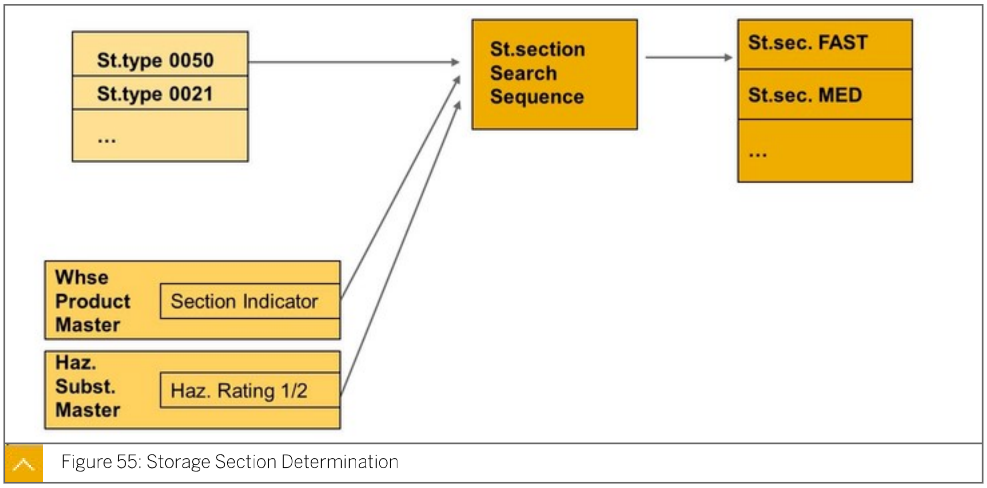


Figure 55: Storage Section Determination

The storage section determination is optional, even if there is more then one storage section, it is not necessary to setup the determination, then the storage section is simply not used during the bin determination. The storage section search sequence can also be a restriction, means that not all storage sections in a storage type are part of the storage section sequence.

For example you want to use the section indicator is used to distinguish between fast and slow moving items. For the fast moving items you want to search in the *Fast* section first, then in the *Slow* section. For slow moving items you only want to search for a bin in the *Slow* section. You never want to find a bin in the *Fast* section for these items.

Another example would be to use the hazard ratings of products to make sure that different hazardous substances are not stored next to each other in the same storage type.

Additionally you have to activate the storage section determination (contrary to the storage type determination, which has to happen). You can also choose to check the storage section. This check is used if you restrict the products to specific sections and the user during putaway tries to change the destination bin. In case the bin is in a "wrong" section, the system would then react with an error message.

Storage Bin Type Determination

In the next step, the system can determine which bin type the destination bin should have. Bin types are used to find the right bin, depending on the size of the pallet on which the material comes. The details are covered in a subsequent lesson.

Storage Bin Determination

After the storage type, the storage section, and the storage bin type have been determined, the system searches for a putaway bin for the product quantity. This bin is determined based on the putaway rule (strategy), and capacity checking. The process is illustrated in the following figure:

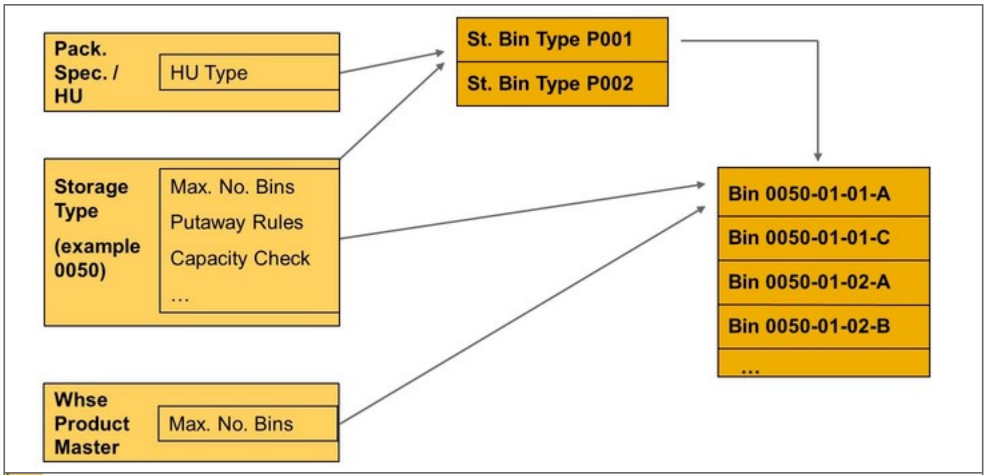
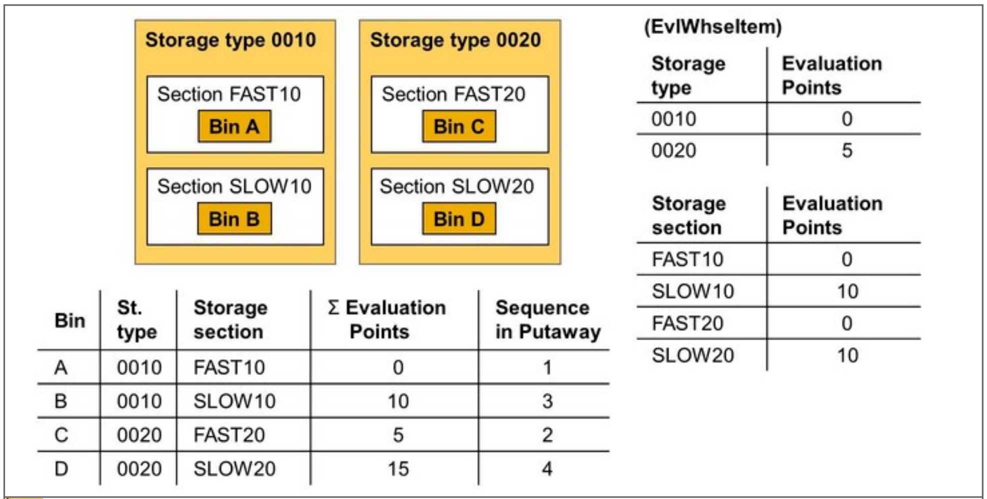


Figure 56: Storage Bin Type and Storage Bin Determination

If, after checking all of the bins in the determined storage type/storage section/storage bin type, the system cannot locate a suitable bin, it continues the search with the next bin type/ storage section/ storage type.

Evaluation Points

In the storage type, storage section, and storage bin type determination tables, there is a field, *EvlWhseItem*, that supplies a weighting factor that can be used to influence the determination of the storage type, section, and bin type. This technique is called evaluation points. With evaluation points, you can change the sequence of storage types/storage sections/bin types in the putaway search sequence. This means, for example, the system first searches for bins in all storage types in the FAST storage sections before searching in all SLOW storage sections, and so on.



(EvlWhseItem)

Storage type	Evaluation Points
0010	0
0020	5

Storage section	Evaluation Points
FAST10	0
SLOW10	10
FAST20	0
SLOW20	10

Bin	St. type	Storage section	Σ Evaluation Points	Sequence in Putaway
A	0010	FAST10	0	1
B	0010	SLOW10	10	3
C	0020	FAST20	5	2
D	0020	SLOW20	15	4

Figure 57: Example of the Use of Evaluation Points

Priorities

Instead of using *Evaluation Points* , it is also possible to change the *Priorities* in the determination of storage type, storage section, and bin type. The standard priorities are *High* for the storage type, *Medium* for the storage section, and *Low* for bin types, and this creates the standard sequence of the determination as explained in the beginning of this lesson. You could change for example the priority for bin types to *High* and for storage types to *Low*. Then the system would first search for a preferred bin type (in the storage types which are in the storage type search sequence). But evaluation points give you a higher flexibility.

LESSON SUMMARY

You should now be able to:

- Configure direct putaway

Unit 5
Lesson 4

Applying Putaway Rules

LESSON OVERVIEW

Putaway rules and strategies are the predefined methods the EWM system uses to determine the destination putaway bin locations in the warehouse task creation process. In this lesson you learn how to apply the various putaway rules.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Apply putaway rules and strategies
- Apply the fixed bin putaway strategy
- Apply the general storage putaway strategy
- Apply the addition to existing stock putaway strategy
- Apply the empty storage bin putaway strategy
- Apply the bulk storage putaway strategy
- Apply the pallet storage putaway strategy
- Apply the near fixed picking bin putaway strategy
- Apply the flexible storage behavior

Putaway Strategies

The putaway strategy is used to determine the bin or bins for the storage of your products. In SAP EWM, you implement the putaway strategies, in most cases, by configuring one or more of the following fields in the storage type definition:

- Storage Behavior

  Possible parameters include the following:

  - blank - Standard Warehouse
  - 1 - Pallet Storage
  - 2 - Bulk Storage
  - 3 - Flexible Storage

> Note:
> Storage behaviors other then “Standard Warehouse” require additional settings for the storage type.

- Putaway Rule

  Possible parameters include the following:

  - 2 - Addition to Existing Stock / Empty Bin
  - 4 - General Storage Area
  - 5 - Empty Bin

> Note:
> The putaway rule “3 - Consolidation Group” is only used for packaging work centers and in a transit warehouse. Also the putaway rule “6 - Transit Warehouse: Staging Area for Door” can only be used in a transit warehouse.

- WT Generic

  Possible parameters include the following:

  - blank - Not generic
  - 1 - Only St. Type - Section
  - 2 - Only Storage Type

You can use the Business Add-Ins (BAdIs) in the /SCWM/ES_CORE_PTS enhancement spot to make changes to the putaway strategies.

The putaway strategies are outlined subsequently.

Manual Entry

Using the manual entry strategy, the system does not determine a storage section or a storage bin. You enter the destination storage bin manually when the warehouse task is created or confirmed. You generally use this procedure if the search for a suitable storage bin is performed on-site by a warehouse worker.

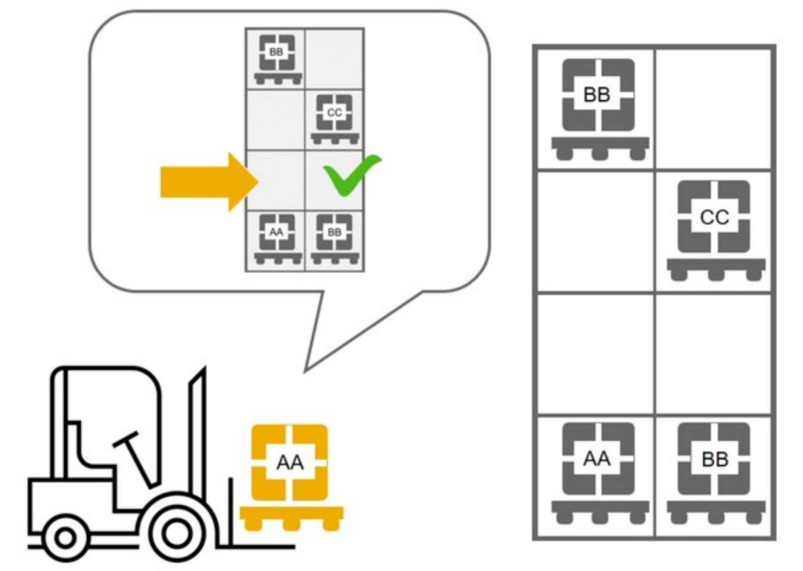


Figure 58: Manual Entry Putaway Strategy

Maintain the following storage type configuration settings to implement the manual entry putaway strategy:

- *Storage Behavior* : standard warehouse
- *Putaway Rules* : next empty bin, or additions to existing stock/empty bin
- *WT Generic*: only storage type

Fixed Storage Bin

You apply this strategy to put away a product in bins that are pre-assigned to the product. You use this strategy primarily with storage types from which picking is done manually. If you want to put away a product without fixed bin assignment in a storage type for which you have defined fixed storage bin strategy, the system can determine a suitable storage bin and assign it to the product as a fixed storage bin. In SAP EWM one or more fixed bins can be assigned to a warehouse product. The system can also automatically remove the assignment. A setting in the warehouse product master and storage type can limit the number of bins assigned to a warehouse product.

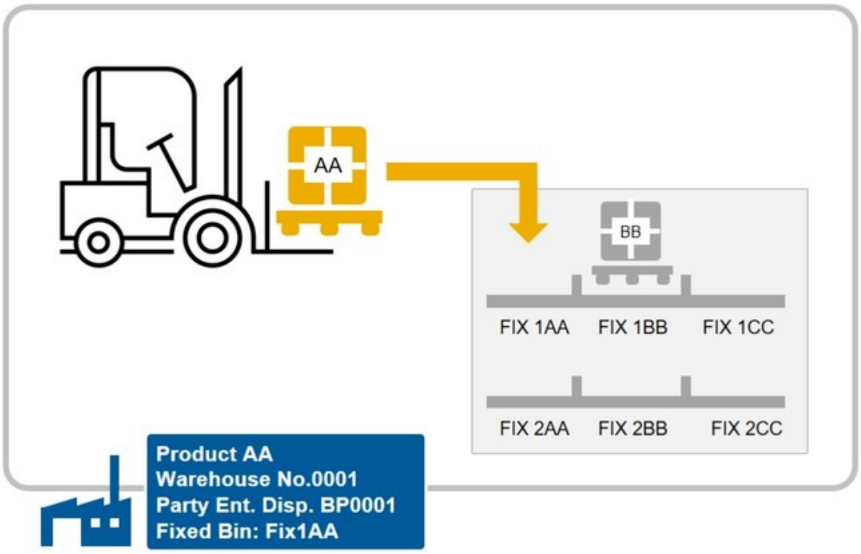


Figure 59: Fixed Bin Putaway Strategy

Fixed Bin Strategy Configuration Settings

Maintain the following master data configuration settings to implement the fixed bin strategy:

- Assign fixed bins to the warehouse product masters.
- Make the following storage type configuration settings to implement the fixed bin strategy:
  - *Storage Behavior* : standard warehouse
  - *Putaway Rules* : addition to existing stock/empty bin
  - *Addn.Stock Forbidden* : addition to existing stock permitted
  - Set the *Use Fixed Storage Bins* indicator
  - Set the *Max. Fixed Bins* field if this control is required
  - Activate a form of capacity checking

General Storage

The system uses the general storage strategy to find a storage bin in a general storage area. With the general storage putaway strategy, you define a single storage bin per storage section. The quants in the storage bin can also be in the form of mixed storage. The following figure illustrates the general storage strategy:

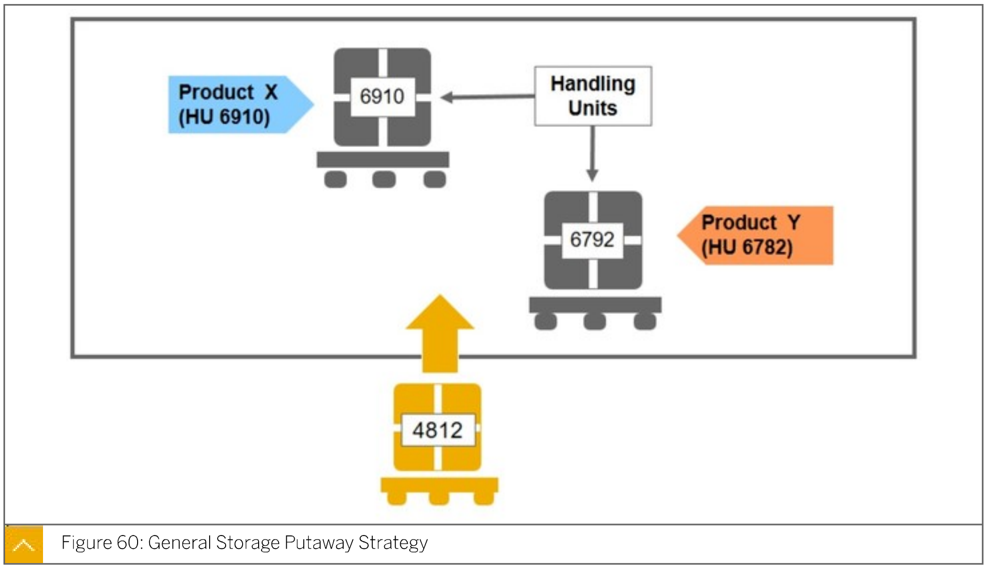


Figure 60: General Storage Putaway Strategy

Maintain the following storage type configuration settings to implement the general storage putaway strategy:

- *Storage Behavior* : standard warehouse
- *Putaway Rules* : general storage area
- *Mixed Storage* : mixed storage without limitations

Technically it is not required, but it is recommendable to activate the *HU Requirement* for a storage type with this putaway rule.

Addition to Existing Stock

With this strategy, the system tries to put away stock in storage bins that already contain stock of the same product. A prerequisite for adding to existing stock is that sufficient free capacity exists in the storage bin. If the system cannot find a storage bin with the same product, or if the storage bin does not have sufficient free capacity, the system searches for the next empty storage bin. This strategy violates the FIFO principle.

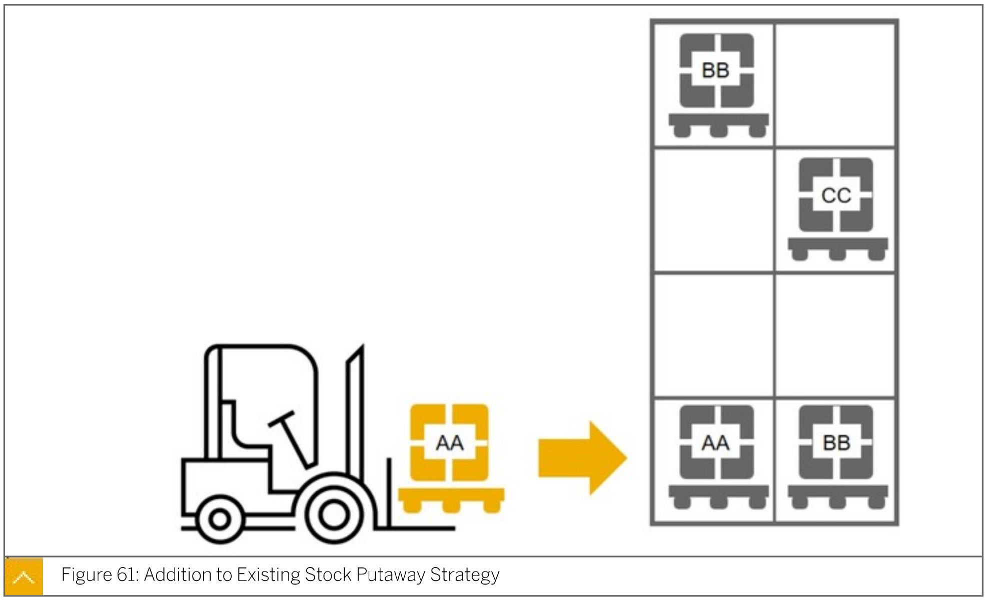


Figure 61: Addition to Existing Stock Putaway Strategy

Maintain the following storage type configuration settings to implement the addition to the existing storage strategy:

- *Storage Behavior* : standard warehouse
- *Putaway Rules* : addition to existing stock/empty bin
- *Addn.Stock Forbidden*

  If you want to allow additions to existing stock, choose " " (Addition to existing stock permitted) or M (Addition to existing stock via *addtn ID* in *Product Putaway Profile* in Customizing). If you choose M, you must choose the required value for the *Addit.to Exist.Stock* indicator in the product putaway profile.
- *Mixed Storage* : only one HU allowed per bin
- Configure a method of capacity checking

Empty Storage Bin

With this strategy, the system finds an empty storage bin. You use this strategy to support warehouses that are organized randomly, where products are stored in individual storage sections. This strategy is especially suited for high rack storage and shelf storage.

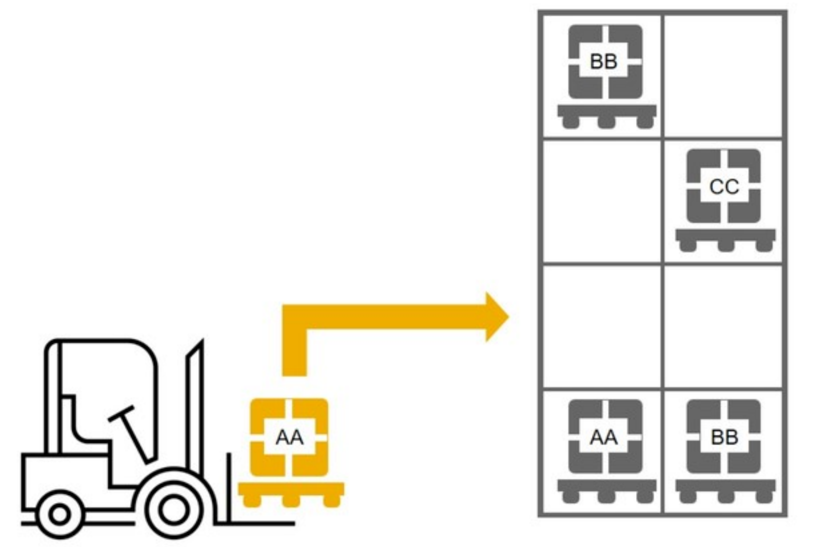


Figure 62: Empty Storage Bin Putaway Strategy

Maintain the following storage type configuration settings to implement the empty storage bin putaway strategy:

- *Storage Behavior* : standard warehouse
- *Putaway Rules* : empty Bin

You also have the option to change the sort sequence of the storage bins. This effects the determination of the empty storage bin under *SrchRule EmptyBin* .

Bulk Storage

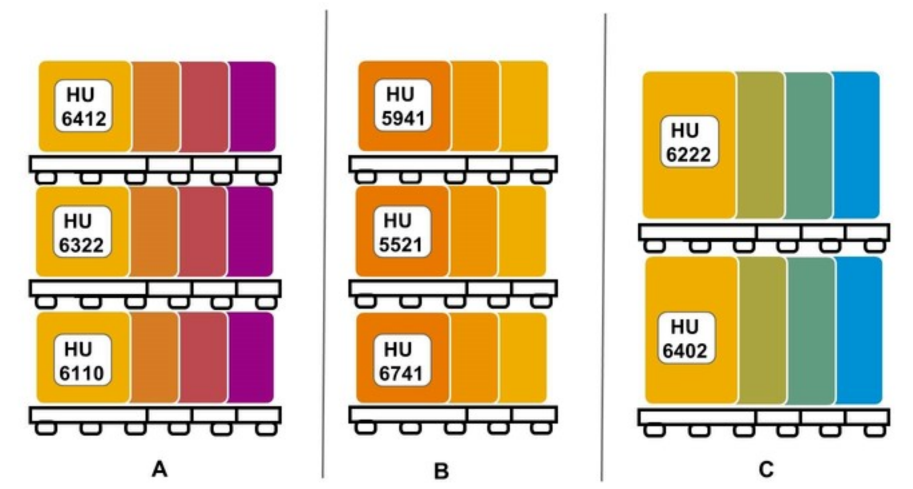


Figure 63: Bulk Storage Putaway Strategy

Bulk storage is defined as a warehouse area without shelves, where similar pallets or containers are stacked. In many instances, the storage bins in bulk storage are separated by lines on the warehouse floor. Each bin generally holds only one product, for example, barrels with a specific color. Products such as canned goods or soft drinks that come in large quantities and require a large amount of storage space are often stored in bulk storage. The advantages of bulk storage include the following:

- Reduced need for physical storage bins
- Fast access to the products
- Clear structuring of the warehouse (into blocks and rows)

Bulk Storage Characteristics

The characteristics of bulk storage are as follows:

- Coordinate structure: The warehouse space is divided into blocks, which in turn are divided into individual rows.
- One storage bin per row: In the system, a row is created and managed as a storage bin.
- Mixed storage: You should not put away HUs with different products in the same row. However, in general, all combinations of mixed storage are allowed in bulk storage. You can also define that all products in the storage bin must have the same batch.

> Note:
> While it is possible to allow mixed storage, SAP Note 2180663 describes that the system will not automatically create mixed storage in a bulk storage bin. Even if the note refers to older EWM releases, it still describes the behavior correct.

- Different HU types: In bulk storage, you often manage different HU types with different dimensions.

Bulk Storage Putaway Strategy Configuration Settings

Maintain the following storage type configuration settings to implement the bulk storage putaway strategy:

- *Storage Behavior* : bulk storage
- *Putaway Rules* : additions to existing stock/empty bin
- *Addn.Stock Forbidden* : addition to existing stock permitted
- Do not activate the HU type check or capacity checking

In the putaway settings for bulk storage types, you can set two special blocking mechanisms:

- Blocked for Putaway after Stock Removal

  The flag *Putaway Blocked* will trigger that a bin is blocked for further putaway after the first stock removal has taken place. This block is automatically deleted after the last handling unit has been removed from that bin.

- Time limit

  The entry in the field *Time limit* shows the number of days after the first putaway in this bin after which no goods should be putaway into the same bin. This helps to violate the FIFO principle only to a certain degree. To set the block it is necessary to run the report /SCWM/RLS10050. This should be done periodically in the required interval. Also this block is automatically deleted when the bin is empty.

You can define how you want to store a particular product in bulk storage by entering the bulk storage indicator in the product master record and the bulk storage sectioning table when defining the structure of a block.

You can also define whether or not partial quantities are allowed. This is only considered during stock removal and requires a packaging specification for the definition of the full quantity.

Pallet Storage

Using this putaway strategy, the system processes different HU types (for example, euro pallets or industrial pallets) and allocates them to a suitable storage bin section. This storage strategy is commonly used in storage types that represent areas of pallet racking in the warehouse. One storage bin is often divided into several smaller sections. Using this strategy, it is assumed that you only put away HU with the same base dimensions in a storage bin.

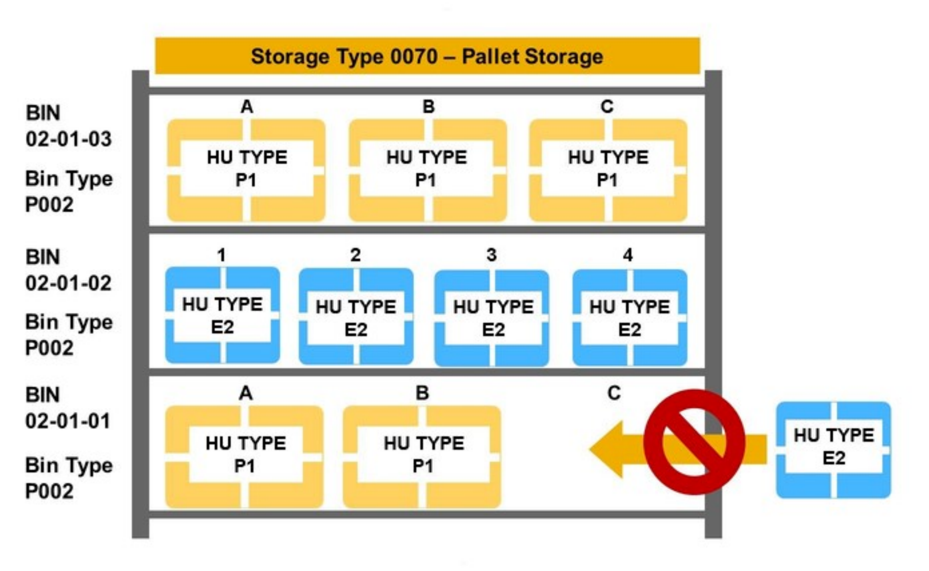


Figure 64: Pallet Storage Putaway Strategy

High rack storage is frequently designed so a storage bin can accommodate several different HU types. For example, a storage bin can accommodate multiple pallets depending on the size of the pallet, such as three euro pallets (80 x 120 cms) or two industrial pallets (100 x 120 cms).

The first time that the system assigns a pallet in this storage bin, it determines the storage bin sectioning, depending on bin type and HU type. The system also generates the storage bin sections as storage bins in the system (for example, 02-08-01/1, 02-08-01/2, and 02-08-01/3), based on the first HU that is put away. The storage bin sections are deleted as soon as you have removed the last HU from the storage bin.

Near Fixed Picking Bin

Use this strategy to put away products in a reserve storage area. This strategy is used where reserve storage bins of a reserve storage type are located directly above the fixed storage bins in a picking storage type (nearby reserve).

In Customizing, define a reserve storage type, and then define a fixed bin storage type as a reference to this reserve storage type. You can also define search scope, which restricts the maximum distance from the reserve bin to the fixed bin.

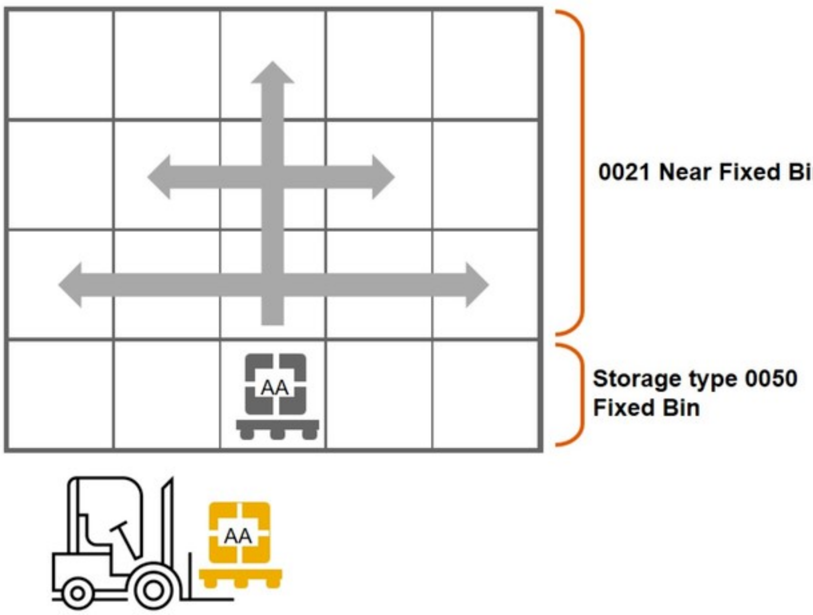


Figure 65: Near Fixed Picking Bin Putaway Strategy

Maintain the following storage type configuration settings to implement the near fixed picking bin putaway strategy:

- *Storage Behavior* : standard warehouse
- *Putaway Rules* : empty bin or addition to stock/empty bin
- *SrchRule Empty Bin* : near to fixed bin

Note:
The standard coding for this strategy does only search for reserve bins in the same aisle as the fixed bin. With the BAdI /SCWM/EX_CORE_PTS_FILT_SORT it is possible to find reserve bins from other aisle. For details see SAP Note 1551392 - Near fix bin search: Aisle change using BAdI. SAP Note 1557313 - BAdI /SCWM/EX_CORE_PTS_FILT_SORT: Aisle change: Near fix bin explains that this only works if the coordinates for aisles and stacks have numerical values.

Flexible storage

The flexible bin is a new storage solution within a flexible bin area in a warehouse which is defined on the basis of cell size. A flexible bin is created on an as-needed basis and deleted when empty. Flexible bins are useful in storage facilities where it does not make sense to create bins of fixed sizes in advance, as the facilities are normally empty buildings without shelves that hold items of very different sizes. This function was developed specifically for the requirements of defense forces.

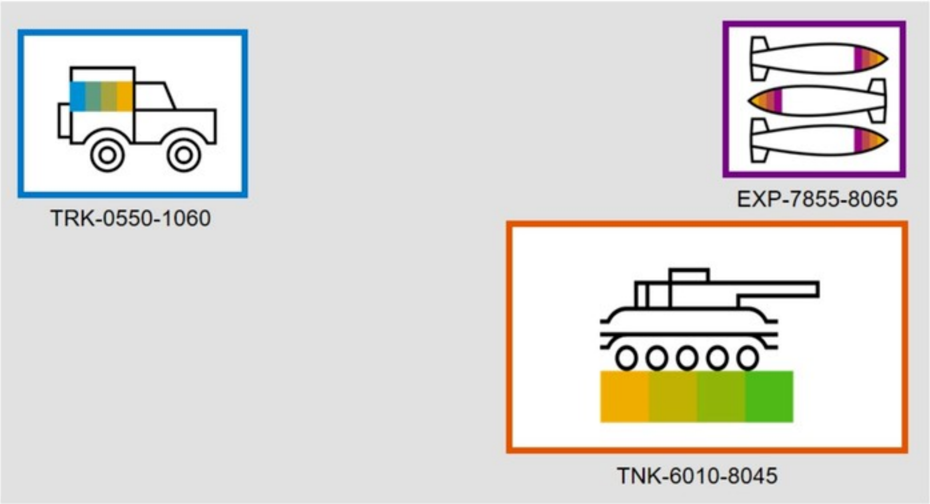


Figure 66: Flexible Storage

The flexible bin area is defined by a storage type and is always linked to a pattern via a pattern ID. It positions the area regarding the warehouse so you are able to calculate the absolute bin coordinates. There are mandatory settings for the storage type:

- The **Storage Behavior** must be “Flexible Storage”
- **Use Fixed Bins** must be blank
- **Putaway Rules** must not be set on “Empty Bin”
- **HU Type check** must be blank
- **WT Generic** must be set on “Only Storage Type”

LESSON SUMMARY

You should now be able to:

- Apply putaway rules and strategies
- Apply the fixed bin putaway strategy
- Apply the general storage putaway strategy
- Apply the addition to existing stock putaway strategy
- Apply the empty storage bin putaway strategy

- Apply the bulk storage putaway strategy
- Apply the pallet storage putaway strategy
- Apply the near fixed picking bin putaway strategy
- Apply the flexible storage behavior

Unit 5
Lesson 5

Checking Capacities

LESSON OVERVIEW

This lesson covers the various methods available in the putaway process to control how much stock is put away in a storage bin.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Describe the various capacity checking methods in EWM

Capacity Checking

When you implement certain putaway strategies, such as the fixed bin strategy or the additions to stock strategy, it is necessary to perform a capacity check in the search for a suitable storage bin. If you have activated the capacity check, the system checks whether the selected storage bin can accept the quantity to be put away when it creates a warehouse task (WT).

You must maintain capacity data for the storage bins. The capacity of a storage bin can be checked for the following:

- Weight
- Volume
- Capacity key figure

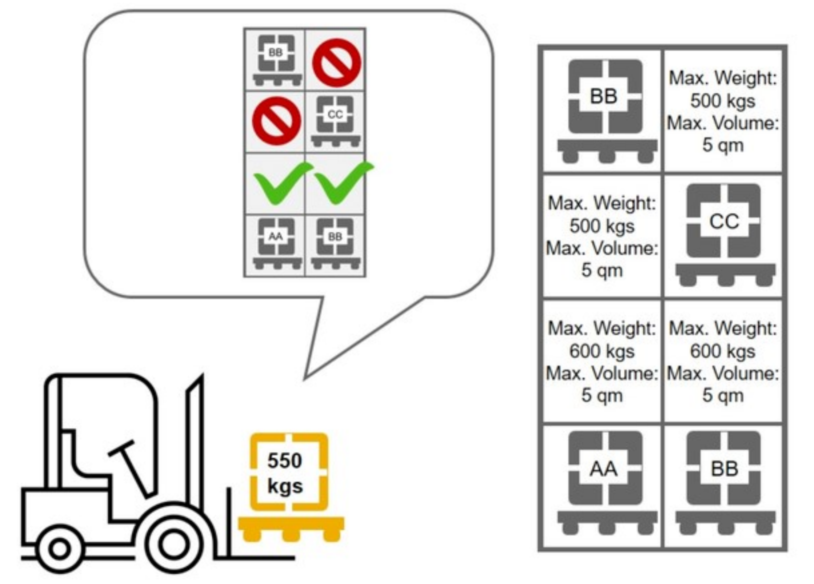


Figure 67: Capacity Check based on Weight or Volume

If capacity checking is based on weight and/or volume, no configuration is required. The system automatically performs weight and/or volume capacity checking when the maximum weight and/or volume is entered as storage bin data.

You can calculate the capacity consumption for the capacity key figure (a capacity without dimension) in three different ways:

1. Check according to key figure product
2. Check according to key figure packaging material (for the handling unit)
3. Check according to key figures of the product **and** packaging material

For storage types for work centers and material staging areas, you can set the capacity check code to **4**, to turn off all capacity checking.

Check According to Key Figure Product

With check according to key figure product, the system calculates the capacity consumption for the product based on the product master. The capacity consumption is specified at the unit-of-measure level on the *UOM* tab in the product master. You can enter the total capacity in the storage bin or at the storage bin type level in Customizing. The check according to the key figure of the product is illustrated in the following figure:

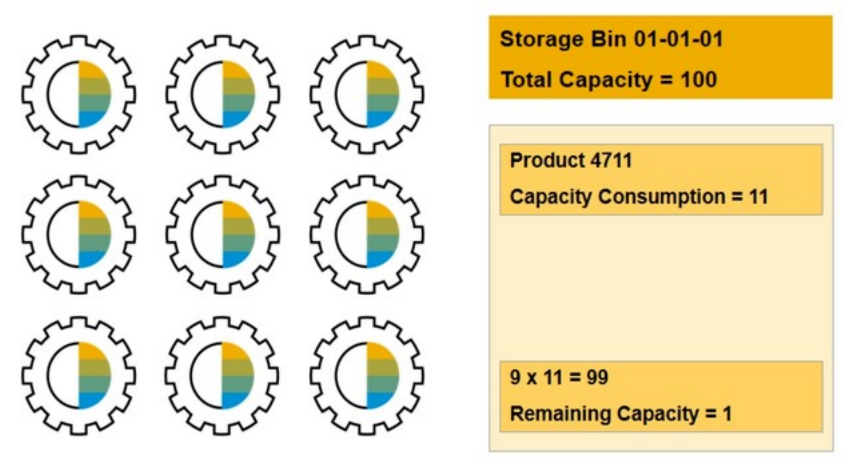


Figure 68: Check Using Key Figure Product

Check According to Key Figure Packaging Material

With check according to key figure packaging material, the system calculates the capacity consumption based on the packaging material used for the HU. This type of check is illustrated in the following figure:

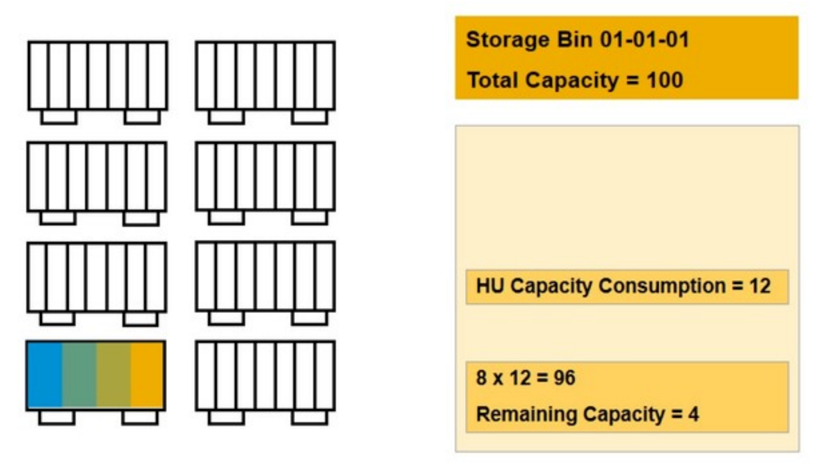
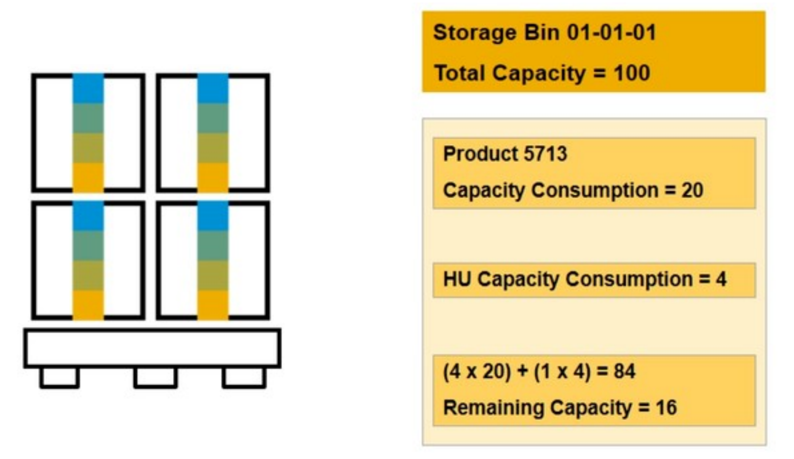


Figure 69: Check Using Key Figure Packaging Material

Check According to Key Figures of the Product and Packaging Material

With check according to key figures of the product and packaging material, the system calculates the capacity consumption based on both the product and the packaging material used for the HU. This type of check is illustrated in the following figure:



Storage Bin 01-01-01
Total Capacity = 100

Product 5713
Capacity Consumption = 20

HU Capacity Consumption = 4

(4 x 20) + (1 x 4) = 84
Remaining Capacity = 16

Figure 70: Check Using Key Figure Product And Packaging Material

In the case of mixed storage (that is, different products in one storage bin), we recommend the capacity check in accordance with the product and Packaging Material.

Storage Bin Type Determination

As an alternative to a “real” capacity check using weight, volume, or key figures, you can also use storage bin type determination. To activate storage bin type determination, you first activate the HU type check on the storage type level. You also maintain the allowed HU types per storage type, and the sequence of allowed bin types for each HU type.

Alternatively, in a warehouse product master, you can directly maintain the storage bin type without using the HU type.

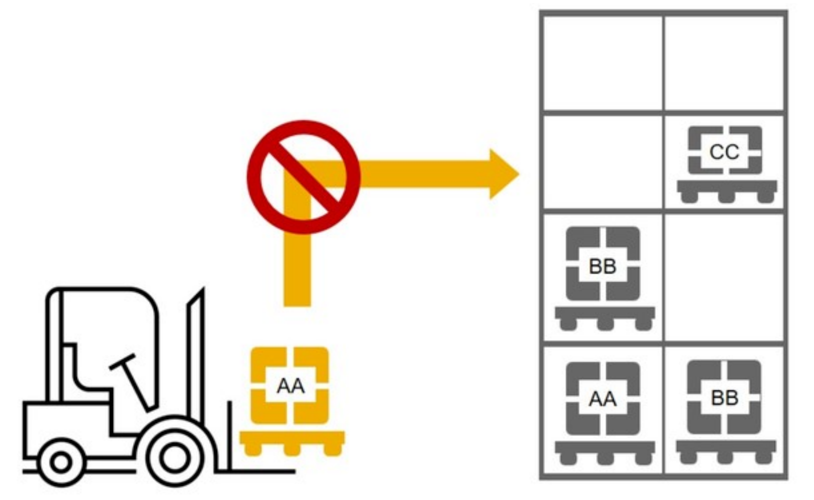


Figure 71: Storage Bin Type Determination

You can also use the maximum weight and volume capacities that are maintained in the storage bin types for the **early capacity check** With this check, all bins with a weight or volume capacity value that is too low are immediately removed from the bin search. This is very important to speed up the bin search in conjunction with a capacity check.

LESSON SUMMARY

You should now be able to:

- Describe the various capacity checking methods in EWM

Unit 5

Learning Assessment

1. Put the following documents in the order of when they are created in the goods receipt process in a decentral EWM.

   Arrange these steps into the correct sequence.

   ☐ ERP: Purchase order
   ☐ ERP: Inbound delivery (ID)
   ☐ EWM: Inbound delivery notification (IDN)
   ☐ EWM: Inbound delivery

2. In SAP EWM Customizing, the ERP plant, storage location, and logical system maps to an availability group.

   Determine whether this statement is true or false.

   ☐ True
   ☐ False

3. In storage section determination, what parameters are used to determine the storage section?

   Choose the correct answers.

   ☐ A Storage type
   ☐ B Bin type
   ☐ C Storage section indicator from the warehouse product master
   ☐ D Hazardous attributes

4. Which of the following putaway strategies are used when the system puts away stock based on the handling unit type?

   Choose the correct answers.

   ☐ A General storage

   ☐ B Additions to existing stock

   ☐ C Pallet storage

   ☐ D Bulk storage

5. What process can you employ instead of capacity checking?

   Choose the correct answer.

   ☐ A Storage bin type determination

   ☐ B Process type determination

   ☐ C Storage process determination

Unit 5

Learning Assessment - Answers

1. Put the following documents in the order of when they are created in the goods receipt process in a decentral EWM.

   Arrange these steps into the correct sequence.

   1 ERP: Purchase order

   2 ERP: Inbound delivery (ID)

   3 EWM: Inbound delivery notification (IDN)

   4 EWM: Inbound delivery

   That's correct! The goods receipt process begins in the SAP ERP system with the advanced shipping notification or purchase order. From this, an inbound delivery is created in SAP ERP. The inbound delivery is replicated to SAP EWM and becomes the IDN. Using the post processing framework (PPF), the ID is created in the SAP EWM system from the IDN.

2. In SAP EWM Customizing, the ERP plant, storage location, and logical system maps to an availability group.

   Determine whether this statement is true or false.

   ☒ True

   ☐ False

   That's correct! In SAP EWM Customizing, the ERP plant, storage location, and logical system maps to an availability group.

3. In storage section determination, what parameters are used to determine the storage section?

   Choose the correct answers.

   ☒ A Storage type

   ☐ B Bin type

   ☒ C Storage section indicator from the warehouse product master

   ☒ D Hazardous attributes

   That's correct! In storage section determination, the storage type, storage section indicator from the warehouse product master, and hazardous attributes are used to determine the storage section in the determination table.

4. Which of the following putaway strategies are used when the system puts away stock based on the handling unit type?

   Choose the correct answers.

   ☐ A General storage

   ☐ B Additions to existing stock

   ☒ C Pallet storage

   ☒ D Bulk storage

   That's correct! Pallet storage and bulk storage putaway strategies are used when the system puts away stock based on the handling unit type.

5. What process can you employ instead of capacity checking?

   Choose the correct answer.

   ☒ A Storage bin type determination

   ☐ B Process type determination

   ☐ C Storage process determination

   That's correct! You can employ storage bin type determination instead of capacity checking.

UNIT 6 Goods Issue

Lesson 1

Outlining the Goods Issue Process in SAP EWM 121

Lesson 2

Applying the Stock Removal Strategies 126

Lesson 3

Configuring Exception Handling 132

Lesson 4

Combining Items in Waves 135

Lesson 5

Implementing Two-Step Picking 143

UNIT OBJECTIVES

- Outline the goods issue process in EWM
- Apply the stock removal strategies
- Handle exceptions and picking differences
- Combine items in waves
- Implement two-step picking

Unit 6
Lesson 1

Outlining the Goods Issue Process in SAP EWM

LESSON OVERVIEW

This lesson presents an overview of the basic goods issue process and the related delivery documents used in EWM. The fundamental configuration settings related to the warehouse process type are also covered here.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Outline the goods issue process in EWM

Goods Issue in SAP EWM

The goods issue process is centered around the use of outbound delivery documents. The figure shows the document flow of the process:

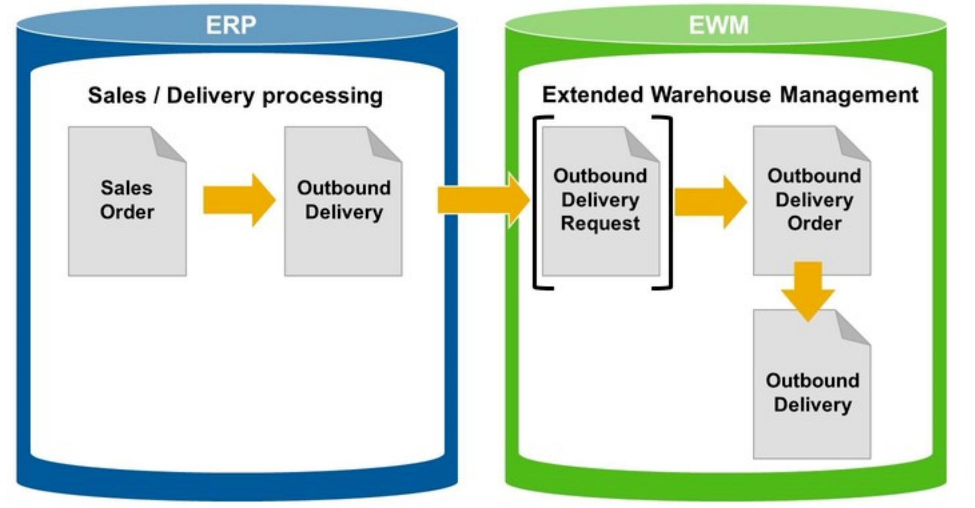

ERP
Sales / Delivery processing
Sales Order
Outbound Delivery
EWM
Extended Warehouse Management
Outbound Delivery Request
Outbound Delivery Order
Outbound Delivery

Figure 72: Outbound Delivery Process

The process begins in the SAP ERP system when the outbound delivery document is created. When the warehouse number, from where the picking is supposed to happen, is a EWM controlled warehouse number, the outbound delivery is replicated to the EWM system. In the EWM system an outbound delivery request (ODR) is created. This is a simple copy of the ERP outbound delivery, using the same document number.

Based on configuration settings in the post processing framework (PPF), the system then creates the outbound delivery order document (ODO). This document contains additional EWM-relevant data that is determined based on the service profiles associated with the outbound delivery document type and delivery category. This is the warehouse request document for the EWM goods issue process.

> Note:
> In an SAP S/4HANA embedded EWM, no outbound delivery request exists. In a decentralized EWM system, the use of the outbound delivery request is optional since SAP EWM 9.5. In these cases the outbound delivery order is directly created.

From the outbound delivery order, the warehouse tasks are created to control the picking and other associated processes such as packing, staging, and loading.

Warehouse Process Type in Goods Issue

When the outbound delivery order is created, the system determines a warehouse process type for each line item.

The warehouse process type is determined for each outbound delivery order item during activation of the outbound delivery request. The warehouse process type is then used in the picking warehouse task.

The following settings are required by the goods issue process:

- *Warehouse Process Type* *2* (stock removal)
- *Activity*: *PICK* (or any activity you have defined for process category 2)

Optional settings include the following:

- *SI Controls: C* (new stock identification)
- *Automatic Wave Determination* : *Yes* (if working with picking waves)
- *Rough Picking Determination*: *Yes* (if picking waves are defined by storage type or for the order-related replenishment)
- *Destination Storage Type/Bin* : normally used to specify the final destination location from where the goods are staged or loaded

> Note:
> In the outbound delivery order incompletion service profile, you can set up an incompleteness check so that an outbound delivery order without a warehouse process type is blocked.

Stock Removal Strategy

For the stock removal strategy, the system, the system determines the following:

- The storage types, from where the stock shall be picked
- The stock removal rule, which sorts the quants according the given sort criteria

The determination is based on parameters from the outbound delivery order (ODO), the warehouse product master, and the hazardous material master data. The following figure illustrates the determination process:

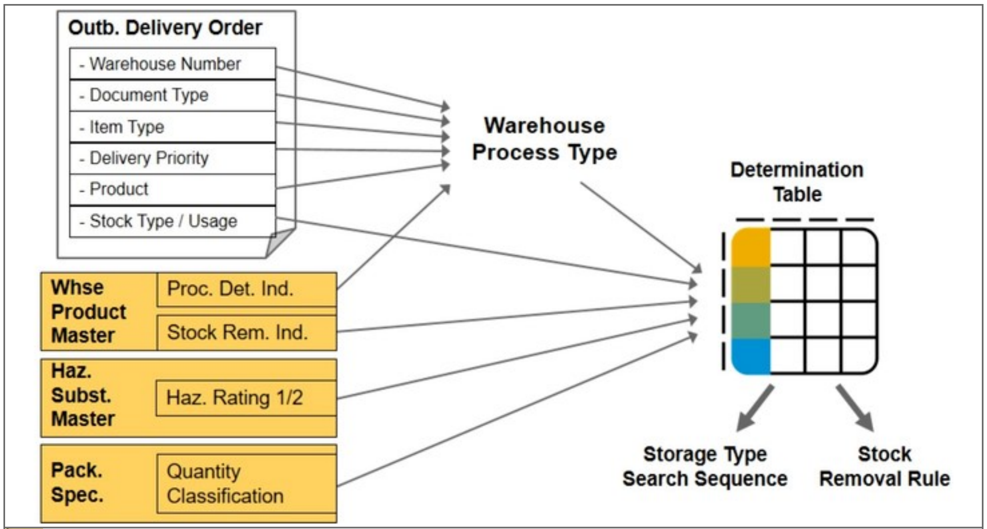


Figure 73: Stock Removal Strategy Determination

Stock Removal Strategy Input Parameters

The following list includes the input parameters that are used to determine the stock removal strategy, and explains how they are derived by the system:

- *Warehouse number*

  This is the only mandatory parameter. The warehouse request has the warehouse on the header level.

- *2 Step Picking* flag

  This is used for the allocation step in the 2 step picking process.

- *Stock Removal Control Indicator*

  This indicator is taken from the warehouse product master. This indicator is normally used when a product has special picking, packing, processing, and/or staging requirements.

- *Warehouse Process Type (Group)*

  This is taken from the ODO.

- *Quantity Classification*

  This is taken from a packaging specification or an alternative unit of measure.

- *Stock Type (group)*

  This is taken from the ODO.

- *Type* - Sales Order Stock or Project Stock

  This is taken from the ODO.

- *Stock Usage*

  This is taken from the ODO.

- *Hazard Rating* - 1 and 2

  This is taken from the hazardous ratings for the product in the ODO.

Access Strategy

Note that the number of these indicators/parameters used in the actual EWM application can have a performance effect on the search. For example, if you use the stock removal control indicator from the product master, and there are products with different stock types, or products that are managed in special stocks (such as sales order stock), the number of required entries in the storage type search sequence table could be large.

To reduce the number of entries, define an access strategy for the storage type search sequence determination table. The system uses this strategy to search using the following logic:

- The system checks whether there is a group assignment for the following entries:
  - *Warehouse process type*
  - *Stock type*

  If the group assignment for these entries exists, the system uses the group code to read the storage type search sequence determination table.
- The system attempts to read a completely qualified entry, in other words, all relevant parameters from the outbound delivery order, all indicators from the warehouse product and, where available, from the dangerous goods master in the storage type search table.
- If the system cannot find any entry in the storage type search table, it attempts to re-read this table using the access strategy.

> Note:
> If a field is not set in the access strategy, the system sets the corresponding value for the determination table to blank.

Storage Type Determination

When creating warehouse picking tasks for goods issue, the system determines the source bins of the quantities of the product to be picked. The system must first, however, determine the storage types which are to be considered for stock removal.

The storage type search sequence contains a list of storage types in which the system should search for removable stock. Instead of a list, it can also contain a storage type group This group also contains a list of storage types. The difference is as following:

- When the storage types are assigned to the storage type search sequence, they have a sequence number. This means that the system searches in the storage types one by one, uses the sort criteria from the stock removal rule, and stops when enough stock has been found. So not all storage types might be considered.
- In a storage type group the system first assembles the information of all the relevant quants in the included storage types and then applies the stock removal rule.

An additional parameter in the storage type search sequence controls whether stock in transportation units (TUs) is to be considered.

To specify the storage type search sequence, in Customizing for *SCM Extended Warehouse Management*, choose *Extended Warehouse Management* → *Goods Issue Process* → *Strategies* → *Specify Storage Type Search Sequence* .

To specify the storage type group and assign storage types to a group, in Customizing for *SCM Extended Warehouse Management* , choose *Extended Warehouse Management → Master Data → Define Storage Type Groups* and *Assign Storage Types to Storage Type Groups* .

> Note:
> When you check the definition of storage type search sequences for **putaway**, you will see that you can also assign storage type groups there (Path: *SCM Extended Warehouse Management → Extended Warehouse Management → Goods Receipt Process → Strategies → Storage Type Search → Assign Storage Types to Storage Type Search Sequence* . In this assignment table you will find a column *Storage Type Group*).
>
> This does **not** have the same effect as using such a group during picking. For putaway the system will still search in the first storage type for a bin and consider the next storage type when no bin is found. The sequence of storage types inside such a group is then controlled by the field *Putaway Sequence* from the warehouse product (Storage Type Data).

LESSON SUMMARY

You should now be able to:

- Outline the goods issue process in EWM

Unit 6
Lesson 2

Applying the Stock Removal Strategies

LESSON OVERVIEW

This lesson focuses on the predefined stock removal strategies in the SAP EWM system. These strategies are used to indicate to the system how storage bins should be accessed for the picking of a product.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Apply the stock removal strategies

Stock Removal Strategies

A stock removal strategy is a method of determining the bins from which to pick one or more quants of a product from stock. This process occurs after the system has determined a storage type based on the storage type search process. The search for a quant occurs within a storage type, or within a storage type group (the storage type group is commonly used in the strict FIFO removal strategy).

The stock removal rule defines which information the system shall use to sort the quants for the selection process. You determine the stock removal rule together with the storage types search sequence. A stock removal rule can also be assigned to a storage type directly, this would supersede a stock removal strategy which was found with the storage type search sequence.

Creation of the Stock Removal Rules

You can view or customize the *Stock Removal Rule* definition table in Customizing for *SCM Extended Warehouse Management*, under *Extended Warehouse Management → Goods Issue Process → Strategies → Specify Stock Removal Rule*.

The quant sorting can contain a maximum of 30 fields. For each field, this sorting can be ascending or descending. Most fields are from the table of the available quantity (*/SCWM/AQUA*). The following special fields are filled dynamically:

- EMPTY_FIXBIN: Empty fixed bin
- PICK_ITM: Open stock removal items for each storage bin
- SPICK_QTY: Open stock removal quantity for each storage bin
- AISLE_ITM: MFS: Open stock removal items for each aisle and level

  The field AISLE_ITM is only filled in an MFS environment. Only one resource has to be assigned to an aisle and level combination.
- SCORE: Points (score) for stock determination

  Points are used if you have set up a stock determination and selected *Stock Determination Dominates* to search for an alternative *Owner* or *Stock Type*.

- STOCK_POS: Stock quantity is positive

Example: Sorting for Product T-EW01-00

The following table shows the available stock for product T-EW01-00 before the sort.

Table 5: T-EW01-00 Before the Sort

Storage Type	Bin	Availability Quantity (in Base Unit of Measure)	Goods Receipt Date (Timestamp)
0020	0020-01-08	203	2014
0020	0020-04-12	46	2012
0050	0050-03-03	15	2011
0050	0050-05-01	155	2012
0050	0050-07-02	34	2012

Sorting Using the Stock Removal Rule

The following table shows the available stock for product T-EW01-00 sorted using the stock removal rule GR Date (Ascending), Quantity (Descending).

Table 6: Available Stock for Product T-EW01-00 After Sort

Storage Type	Goods Receipt Date (Timestamp)	Availability Quantity (in Base Unit of Measure)	Bin
0020	2012	46	0020-04-12
0020	2014	203	0020-01-08
0050	2011	15	0050-03-03
0050	2012	155	0050-05-01
0050	2012	34	0050-07-02

Sorting Across Multiple Storage Types

Sorting across multiple storage types is possible by defining storage type groups, as shown in the following table.

Table 7: Sorting Across Storage Types

Storage Type Group	Storage Type	Goods Receipt Date (Timestamp)	Available Quantity (in Base Unit of Measure)	Bin
G1	0050	2011	15	0050-03-03
G1	0050	2012	155	0050-05-01
G1	0020	2012	46	0020-04-12

Storage Type Group	Storage Type	Goods Receipt Date (Timestamp)	Available Quantity (in Base Unit of Measure)	Bin
G1	0050	2012	34	0050-07-02
G1	0020	2014	203	0020-01-08

Stock Removal Strategies Supported in Goods Issue

The following table shows possible stock removal strategies in the goods issue process.

Table 8: Stock Removal Strategies Supported in Goods Issue

FIFO	first in, first out
Stringent FIFO	FIFO across several storage types
LIFO	last in, first out
Shelf life	Shortest remaining shelf life
Partial quantities	Differentiate if you need a full pallet (standard quantity) or less
Large/small quantities	Different units from different storage types
Fixed bin	Fixed bin information as for putaway

Hint:
Note that these rules do not pre-exist in the system (with the exception of fixed bin, which is controlled by a flag in the storage type). You create them by sorting the quants as described in the rules. In theory, you can combine rules or make up your own (if there is any other field you want to use for sorting).

FIFO (First-In, First Out)

For this removal strategy the quants are sorted according to the goods receipt date in the quant. There are actually two sort fields which can be used:

- WDATU

  This is date and time of goods receipt.

- WDATU_DATE

  This is only the goods receipt date, without time of day.

Stringent FIFO

Use this rule when you want to apply the FIFO rule across several storage types. Apply the rule by using storage type **groups**. The stock is sorted by the defined sort fields within one storage type group. Each storage type search sequence can have a different storage type group.

Then defining a storage type search sequence, you can not only assign either a list of storage types or a storage type group. You could also have:

- an individual storage type and then a storage type group
- a storage type group followed by an individual storage type
- more then one storage type groups

Combined with a sorting rule by goods receipt date, this would not really be considered as stringent FIFO, but this gives a huge number of possibilities to implement your pick strategy.

LIFO (Last In, First Out)

For some warehouses the FIFO principle is not possible. For example, in the building materials industry, products that are to be removed from stock, such as lumber, are stacked on stock that is already stored in the warehouse. To implement the FIFO strategy, the warehouse worker would first have to remove the stock lying on top to get to the stock with the oldest goods receipt date. You can implement the LIFO strategy for such situations. When the system searches for a suitable quant to remove from stock, it always suggests the last quant that was placed into stock.

The three stock removal strategies FIFO, stringent FIFO, and LIFO, all use the same information, the goods receipt date. The trick is that for FIFO and stringent FIFO the sort sequence is the other way then for LIFO.

The same way you implement stringent FIFO, you could define stringent LIFO, by using a storage type group (if this would be required).

Shelf Life Expiration Date

With this strategy, the system ensures that the products with the shortest shelf life expiration date are removed from stock first. This strategy is implemented like the other date-based removal strategies in a stock removal rule. The *shelf life expiration date* is specified as the sort criteria and applied to individual storage types or a storage type group.

Partial Quantities First

With the partial quantities first strategy, the system takes a full handling unit or tries to remove stock in partial handling units first, depending on the required quantity, therefore optimizing the management of stock in the warehouse. With this strategy, the number of partial handling units in a storage type is kept to a minimum. This strategy is useful if you store material in a standard package quantity size (for example 100 pieces on one pallet) and you either have to pick:

- Full pallets

  In this case you probably choose the pallet with the oldest goods receipt date.
- Less then full pallet

  For this you pick from a partial pallet.

> Note:
> This strategy does not require Handling Units. Also "pallet" is just an example for the standard package quantity size.

To implement this strategy, maintain the following settings:

- Define a stock removal rule with ascending quantity (piece) and a stock removal rule with descending quantity (standard HU). As additional sort field you would use the goods receipt date.

- Define quantity classifications for the warehouse in Customizing and use these to determine the stock removal rules.
- Define a packaging specification for the product or use alternative units of measure.

  The packaging specification or the alternative unit of measure is used to determine the *Quantity Classification*.

Let us stay for an example with the standard quantity of 100 pieces.

- For the first delivery you need 100 pieces. The system determines the quant with the oldest goods receipt date.
- For the next pick you need only 50 pieces. As you only have full pallets, the system uses the oldest quant and you take 50 pieces from that pallet.
- Next you need 100 pieces again. From the complete pallets again the one with the oldest goods receipt date is taken. Still one opened with 50 pieces exist.
- Then you need to pick 60 pieces. First the opened pallet (50 pieces) is used, then from the oldest full pallet 10 pieces are used. So the opened pallet has 90 pieces.

  From a strategy perspective this is done because there should never be more then one opened pallet. That means also that in the case of more then one opened pallet (which happens for example, in case of a blocked bin), for a partial pick the pallet with the lowest quantity is used first. From a technical perspective this happens because we simply sort the quants by the available quantity (as described above)

The system will never make something like an "optimized" pick, meaning in case of quants with various quantities, choose the one with the best fitting quantity. For this a Business Add-In (BAdI) implementation would be required.

Large/Small Quantities

You implement this strategy to remove stock based on quantity size. For example, if small quantities (cartons) are requested, the system searches the stock in storage type A. If large quantities (full pallets) are requested, the system searches the stock in storage type B.

The implementation of this strategy is very similar to *Partial Quantities first*. You require a packaging specification or alternative units of measure to determine quantity classifications. The difference is that with the help of the quantity classifications you determine different **storage type search sequences** rather then different stock removal rules.

Fixed Bin

With the fixed bin strategy, the system uses the storage bins that were assigned to the product master to find stock. But as there can be more then one fixed bin in a storage type, it is interesting to combine this strategy with another stock removal rule.

Consider the following scenario: Several fixed bins are assigned to the same product. You perform order based picking. If there is an open warehouse task for fixed bin 1, the system should create the next warehouse task for fixed bin 2 to avoid a situation where multiple workers are trying to pick from the same bin. To implement this, include the sort field *PICK_ITM (Open Stock Removal Items per Storage Bin* or *PICK_QT (Open Quantity to Remove per Storage Bin)* in your stock removal rule.

If you use fixed storage bin assignments and allow negative available quantities for a storage type, the system also considers the storage bins that do not contain any stock when determining the stock. This means that the system can create warehouse tasks (WTs) for which no stock exists. You use replenishment control to ensure that stock is available in the storage bin at the time of picking.

LESSON SUMMARY

You should now be able to:

- Apply the stock removal strategies

Unit 6
Lesson 3

Configuring Exception Handling

LESSON OVERVIEW

This lesson covers the subject of exceptions and the handling of picking differences in the goods issue process.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Handle exceptions and picking differences

Exceptions

In the everyday operation of the warehouse things can go wrong, for example, a picker cannot find all of the materials they need to pick in a bin; a scanner which is part of the MFS cannot read an HU label; a bin that is supposed to be empty is not; when putting away a pallet, less material is on the pallet than there should be.

Whenever an exceptional situation arises in the warehouse, an exception code is needed to describe in the system what the reason or cause for the exception is, and to trigger the action. Such an action can be highly automated (for example, a delivery can be changed or a physical inventory document created), or very basic (someone is informed that the exceptional situation occurred).

Figure 74: Exceptions

Exception Codes

Whether a warehouse employee cannot fulfill the assigned task, or a sensor picks up an issue, or the system can not process the next step, an exception code is triggered. This exception code is always assigned to a business context and an execution step. The business context describes during which process the exception can be used, for example, during a warehouse task confirmation for a putaway, during a quality inspection, or coming from the MFS. The execution step describes the work environment, for example, if you work with a desktop transaction or with RF, if you confirm the source or target bin, if it is a manual selection, or if it is triggered in the background. While the assignment is important for the possible follow-on actions, the assignment is also necessary to reduce the possible exception codes a user can select. It is not helpful to offer workers dozens of exception codes on the small display of their handheld device, because they are not always able to decide which one is correct.

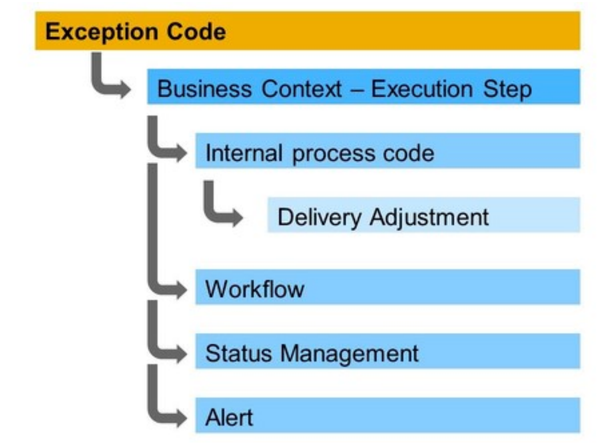


Figure 75: Exception Codes

You assign the follow-on actions to the business context and execution step. Which follow-on actions can be used depends on the business context. The following is a list of the possible follow-on actions:

- Internal process codes

  The internal process code controls internal program reactions after an exception code is entered, for example, a new bin can be found when the required material cannot be picked from the original bin, or replenishment can be triggered. Some internal process codes can also change deliveries. Then additional settings for the delivery adjustment are also required.

- Trigger a workflow

  SAP delivers sample workflows, for example, to trigger a physical inventory document.

- Use the status management

  With the status management, a bin or a HU can be blocked.

- Trigger an alert in the Alert Monitor.

  The Alert Monitor is an SCM-based tool in which you can monitor all of the alerts that have occurred and navigate directly to the relevant application function to resolve the problem.

Examples of Exception Codes

SAP delivers several exception codes for all kinds of warehouse situations. The following are examples of exception code situations:

BIDP, Partial Pick Denial

> The user cannot find the required quantity in the bin. When entering the exception in the mobile device, the system brings up a screen where the user has to confirm the quantity they can pick. The system then tries to trigger a new warehouse task to pick the missing quantity from another bin. Additionally, you can set up the system to trigger a workflow so someone is informed about the situation; that a physical inventory document is created; and that the bin is blocked for putaway and picking.

BIDF, Full Pick Denial

> The user cannot access the bin where they need to pick from. This exception is entered in the mobile device. The system can create a new warehouse task to pick from a different bin. Additionally, you can set up the system to trigger a workflow so someone is informed about the situation; that a physical inventory document is created; and that the bin is blocked for putaway and picking.

DIFD, Difference as Charges for Inbound Delivery

> During putaway the material in the final bin is counted and a difference is found. The full quantity was not delivered from the vendor. The exception is raised, the quantity in the inbound delivery is adjusted, and the goods receipt is corrected.

DIFW, Difference as Charges for Warehouse

> During putaway a piece falls from the pallet and is broken. The correct quantity was delivered, but in the end there is less than delivered. The difference is posted to the Difference Account.

MCAP, Capacity Bottleneck

> An MFS resource, a conveyor segment, or a communication point is full and cannot take any more tasks. However, by triggering the exception code, the system knows that no further warehouse tasks can be sent to the element until the exception is solved. Such an exception is triggered through an internal exception code.

Internal Exception Codes

The system can trigger internal exception codes. These are assigned to external exception codes, which are codes that can also be entered manually. The internal exception code does not offer settings for the follow-up actions — this is set up in the external exception code.

An example is pick denial. A pick denial can be entered by a warehouse worker when a bin is not accessible or the required quantity is not available. In this case, the worker has to enter the correct exception code. The system can also trigger a pick denial. When creating a warehouse task in a case where the required quantity cannot be found in the warehouse, the system can trigger a internal pick denial exception code. This triggers the external exception code and the assigned follow-on action is started.

LESSON SUMMARY

You should now be able to:

- Handle exceptions and picking differences

Unit 6
Lesson 4

Combining Items in Waves

LESSON OVERVIEW

In this lesson, you learn how to create a wave, how to determine a wave template, and how to assign items to waves.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Combine items in waves

Waves

Waves are groupings of warehouse request items (that is typically, the items of outbound delivery orders) that control warehouse activities, like picking. These groupings are then processed together in subsequent processes, for example, the transfer of all warehouse request items assigned to a wave to warehouse task creation.

> Note:
> A warehouse request is an outbound delivery order, a posting change, a stock transfer (for an internal movement in the warehouse), or an inbound delivery - but only for the first three document categories you can create waves. Waves are not possible for inbound delivery items.

SAP Extended Warehouse Management can combine warehouse request items and split items into waves based on criteria such as activity area, route, or product. You can create waves automatically or manually using existing wave templates. If you want to create a wave manually, on the EWM *Index* screen, choose *Extended Warehouse Management* → *Work Scheduling* → *Wave Management* → */SCWM/WAVE Maintain Waves* , and then choose *Create*. SAP EWM creates an empty wave. You enter the remaining information manually such as the assignment of warehouse request items.

> Note:
> When creating waves manually, it is necessary to assign items before saving the wave.

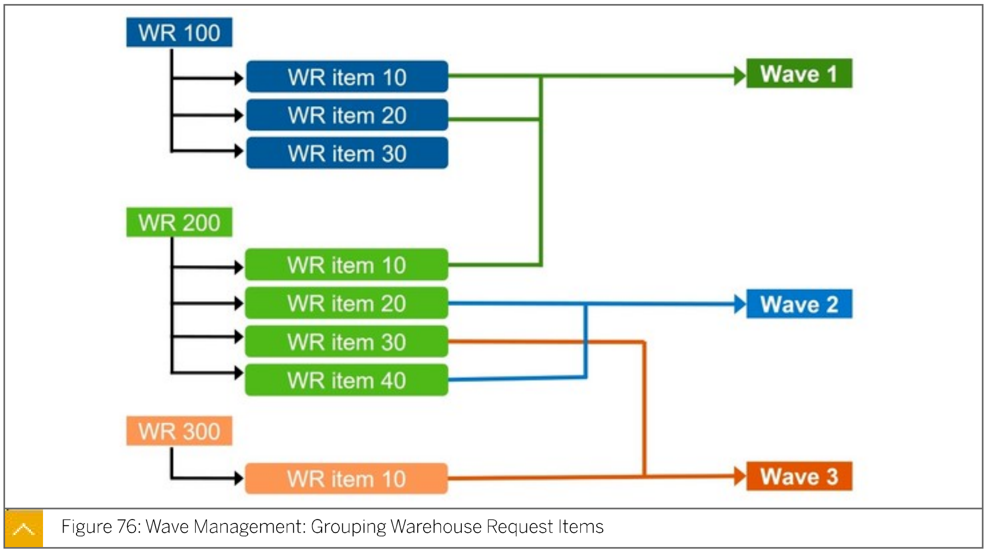


Figure 76: Wave Management: Grouping Warehouse Request Items

Automatic Wave Assignment

You can automate the assignment of warehouse request items to waves. SAP EWM uses the condition technique to determine which wave templates correspond to certain data from the header, item, or split item of a warehouse request.

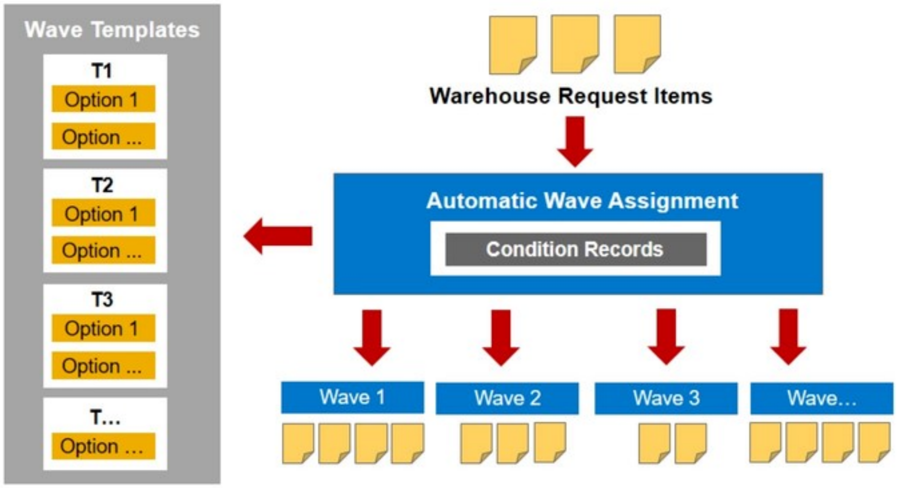


Figure 77: Automatic Wave Assignment with Wave Templates

For automatic wave assignment, the following prerequisites apply:

- You have created wave templates.
- You have defined the conditions for wave template determination.
- You have created condition records that connect the conditions and wave templates.
- You have set the *Automatic Wave Creation* indicator for the warehouse process type that is found for the warehouse request item.

Note:
It is also possible to create waves automatically for a transportation unit. In this case the creation is not triggered through the warehouse process type.

Automatic Wave Assignment Steps

SAP EWM performs automatic wave assignment on multiple warehouse request items as follows:

1. SAP EWM creates a Post Processing Framework action.

   After you or SAP EWM have created or changed a warehouse request, SAP EWM creates a Post Processing Framework action(PPF action) which starts the wave determination.

2. SAP EWM tries to determine a valid wave template for each item or split item in the warehouse request.

3. SAP EWM determines planned completion, wave completion, and lock time.

   - Planned completion time (of the warehouse request item)

     For stock removal, SAP EWM uses the planned date and the planned time for departure from yard. If these dates are not available, SAP EWM uses the dates for the goods issue start for outbound deliveries. In the case of internal stock transfers or posting change deliveries, SAP EWM uses the dates from the Warehouse Activities End Date/Time date/time category.

   - Wave completion

     The wave completion time of the option to be used must not be later then the planned completion time of the item.

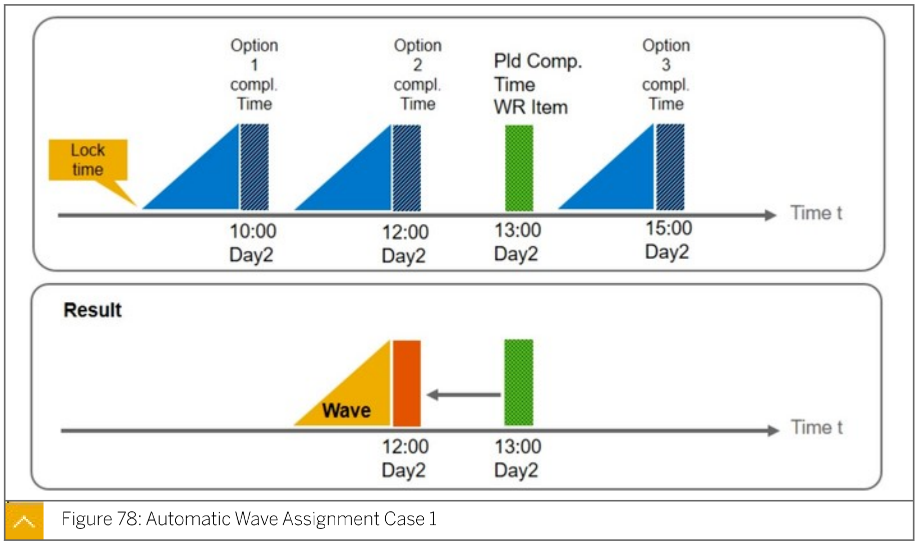


Figure 78: Automatic Wave Assignment Case 1

   - Lock time

     The lock time of the wave option must not be later then the actual time.

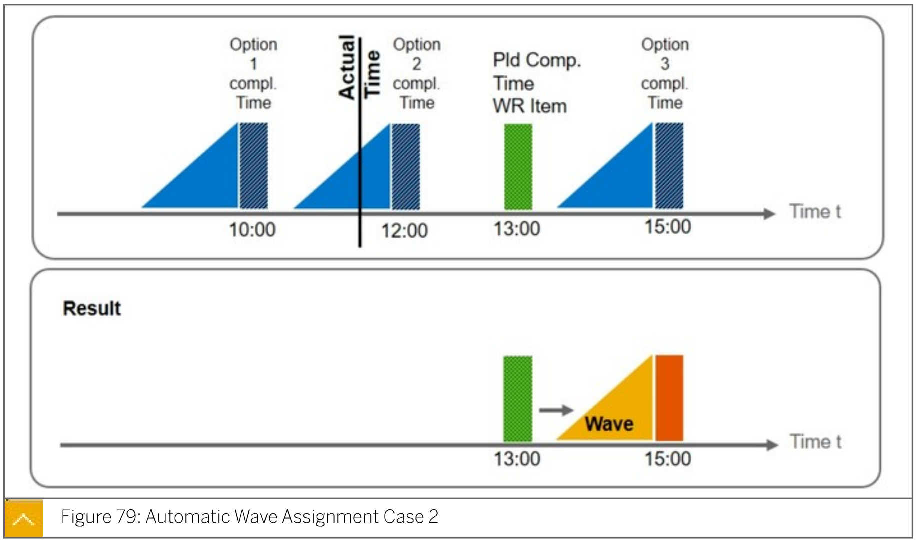


Figure 79: Automatic Wave Assignment Case 2

The system uses the option where the wave completion time is as near as possible or the same as the planned completion time and where the lock time is not in the past. In case the lock time is in the past, the system uses the next possible option (which means that the completion time of the wave is after the planned completion time of the warehouse request item).

4. SAP EWM checks whether a wave already exists for this wave template option.
   - If no corresponding wave exists, SAP EWM creates a new wave with the wave template option that was determined and assigns the item to this wave.
   - If a corresponding wave already exists, SAP EWM assigns the item or split item to this wave. If an exception occurs, for example, if the wave exceeds the wave capacity, SAP EWM creates a new wave using the same wave template option.

> Note:
> In the capacity profile for waves, you can also enter a parameter to control how many parallel waves can be created. If this number is exceeded, the system would use the next wave template option.

   - If a corresponding wave already exists and has already been released, SAP EWM creates a new wave with the same wave template option. SAP EWM then assigns the item to this wave. You can permit exceptions by setting the *Wave Assignment Also Possible After Wave Release* indicator. Setting this indicator enables you to assign another warehouse request item to a wave that has already been released.

Wave Template Structure

A wave template is a schema that defines the attributes of all the waves that are based on it. It serves as the infrastructure for automatic wave assignment. Wave templates enable the same wave attributes to be reused for different warehouse request items that comply with the same conditions. You can also use wave templates to create waves manually, or, in the case of automatic wave assignment, to assign items or split items from the warehouse requests to existing waves that are based on the wave templates.

The following attributes are available for wave templates:

- **Release method**(with the possible values *Automatic*, *Immediate*, and *Manual*)
- **Wave type** (enables specific monitoring in the Warehouse Management Monitor)
- **Wave category** (you can use as a filter for warehouse order creation rules)
- **Wave assignment is also possible after wave release** indicator (you can use to assign additional warehouse request items to a wave that has already been released)
- Control for bin denial

  This allows you to choose between the following options:

  - You can leave an item in a wave, or, in other words, release it again later.
  - You can remove an item from a wave, or, in other words, reassign the item.
  - You can have the system immediately create a warehouse task with an alternative source bin.
- Wave Release Retry Interval

  If you set a retry interval for a wave template, the system automatically schedules a new wave release job when a wave using the template can not create all warehouse tasks due to missing stock. You can specify the retry interval in minutes for when the system should schedule the new wave release job. If there is no retry interval, the system does not create a new wave release job.

Wave Template Options

A wave template may consist of one or more wave template options.

The following attributes are available for wave template options:

- **Data** for date and time

  This includes the following:

  - Cutoff time: the time up to which you can add items to the wave
  - Release time: the time by which the wave must be released. This is used for the automatic wave release job.
  - Pick start and pick completion, pack start and pack completion, staging completion and wave completion
- **Calender** for defining workdays
- **Staging area group** and **Staging area** for the resulting warehouse tasks (WTs)
- Indicator for special activity

  You can use this indicator to change the activity category that is defined by the warehouse request. All WTs created when the wave is released receive the new activity (and thus the corresponding activity area and pick path).
- **Mode** that applies to all WTs created when the wave is released

  A mode is a state that determines the following:

  - Weighting factors used for warehouse order prioritization
  - Time intervals and units of measure for rounding latest starting dates (LSDs)

- Capacity profilefor defining capacity limits

Wave Processing

You can process waves and control your warehouse activities in the following ways:

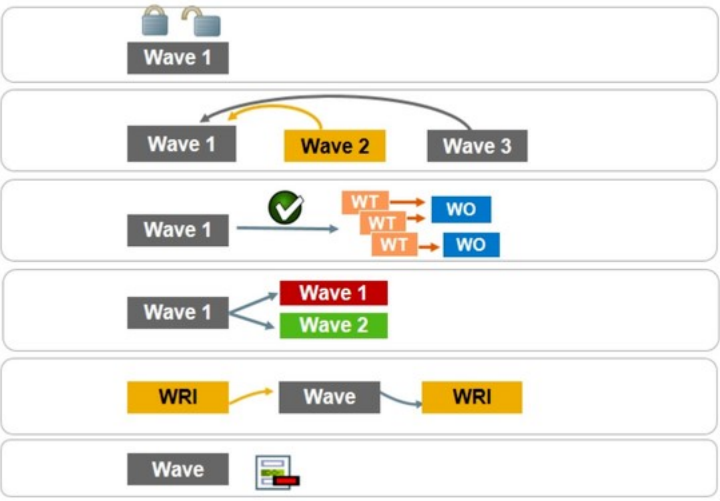


Figure 80: Processing Waves

- Lock or unlock

  You can lock a wave with the status *I* (initial). The status of the wave becomes *H* (locked). When you unlock a wave, EWM resets the status of the wave to *I*. You cannot release locked waves automatically.

- Merge

  You can merge as many waves as you want. The prerequisites are:

  - The waves have not yet been released, in other words, they have the status I (initial, wave is created) or H (hold, wave is locked).
  - All the waves have the same status, either I, or H.

  EWM assigns warehouse request items to the waves. When you merge waves, EWM assigns all the warehouse request items for the selected waves to the first wave selected. EWM always uses the name of the top row. For example, you have waves 123, 456, and 789. If you select and merge these waves, EWM merges these three waves into wave 123.

- Release

  Waves are used to create warehouse tasks and warehouse orders. They can be released in the following ways:

  - Automatically

    EWM creates a job that automatically releases waves on the release day and at the release time.

  - Immediately

When you or EWM create a wave, EWM releases this wave immediately.

  - Manually

    You can manually release a wave at any point in time in the monitor or in wave processing. When you manually release waves, you can also release locked waves. In this case, EWM sets the status *Locked* for the warehouse orders created. As a result, these warehouse orders are locked for further processing for the time being.

    When you or EWM release a wave to generate warehouse tasks, EWM copies the staging area and the mode of the wave to the warehouse tasks. You can release waves multiple times. For example, if you release a wave, but EWM can only generate some of the required warehouse tasks since there is not enough stock, you can release the wave again at a later point in time. You can display the log by using the *Release Log* button. To do so, on the EWM *Index* screen, choose *Extended Warehouse Management → Work Scheduling → Wave Management → Maintain Waves.*

  - Subsystem

    You can release a wave for a downstream subsystem. As a result, EWM transfers the warehouse orders to the downstream subsystem.

- Assign or remove assignment

  You can assign warehouse request items to a wave or remove the assignment. Here, the lock time for the wave must not have expired yet. Moreover, the wave must not have been released yet. If you have set the *Wave Assignment Also Possible After Wave Release* indicator as an attribute in the wave template, you can, however, assign an additional warehouse request item to waves that have already been released.

- Split

  You can select a warehouse request item and remove it from the current wave. EWM creates a copy of the wave and assigns the warehouse request item to the copy.

- Assign automatically

  EWM automatically assigns the chosen warehouse request items to waves, using the same logic as for the automatic wave assignment.

- Delete

  When EWM deletes a wave, it removes the assignment of all the warehouse request items to the wave. EWM deletes a wave completely; in other words, you can no longer archive it.

- Wave Release Simulation

  Details are described in SAP Note 2783735 - EWM Wave Release Simulation.

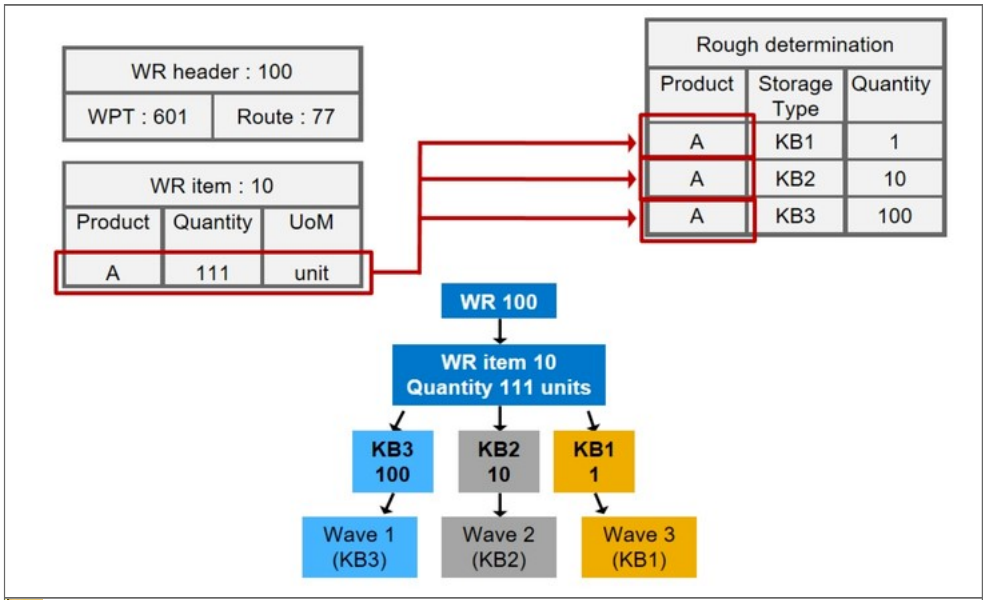
> Note:
> This enhancement was not standard yet for SAP S/4HANA 1909 and is not implemented in our training system, but the note can be implemented in earlier releases.

Creating Logs for Waves

If you want EWM to save the logs for the wave, you create an entry for the warehouse and the subobject WAVE_REL (wave release). For example, you can define that you want to see all messages in the application log with the status *Additional Information*. You make these settings on the EWM *Index* screen under *Extended Warehouse Management → Settings → Application Log → Activate Application Log* .

Assignment of an Item to Different Waves

In the description of the automatic assignment of items to a wave, a **split item** is mentioned. A split item can be created when the flag *Rough Bin Determination* is set in the warehouse process type. When the strategy *Large / Small Quantities* is used, different packaging sizes are picked from different storage types. When the required quantity of the warehouse request item can not be fulfilled by one packaging size, it means that the rough bin determination finds separate storage types for the different packing sizes.



WR header : 100	
WPT : 601	Route : 77

WR item : 10		
Product	Quantity	UoM
A	111	unit

Rough determination		
Product	Storage Type	Quantity
A	KB1	1
A	KB2	10
A	KB3	100

Figure 81: Assignment Of An Item To Different Waves

In the example above, in rough bin determination, EWM assigns warehouse request item 10 with a quantity of 111 of product A to three different storage types for picking in accordance with the quantity-dependent picking strategy. One piece is assigned to storage type KB1, 10 pieces are assigned to storage type KB2, and 100 pieces are assigned to storage type KB3. As the picking duration for these different quantities is probably not the same, it makes sense to determine waves by using the source information. In this case you would usually use the activity area for the picking activity as part of the condition record for the wave determination.

LESSON SUMMARY

You should now be able to:

- Combine items in waves

Unit 6
Lesson 5

Implementing Two-Step Picking

LESSON OVERVIEW

In this lesson, you learn how to organize a two-step picking process in the system.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Implement two-step picking

Two-Step Picking

In two-step picking, the picking process is split into two separate steps. You remove products from a storage type for multiple outbound deliveries in the first step, and assign the products that you have withdrawn to the relevant outbound deliveries in the second step.

This optimizes the process by picking a large number of outbound deliveries on a collective basis. Furthermore, you minimize the total number of picking operations performed during picking by removing the total required quantity of the products in a cross-requirement way in the first step. Moreover, stock removal and allocation are two separate warehouse processes. You create a separate warehouse task for each of these steps.

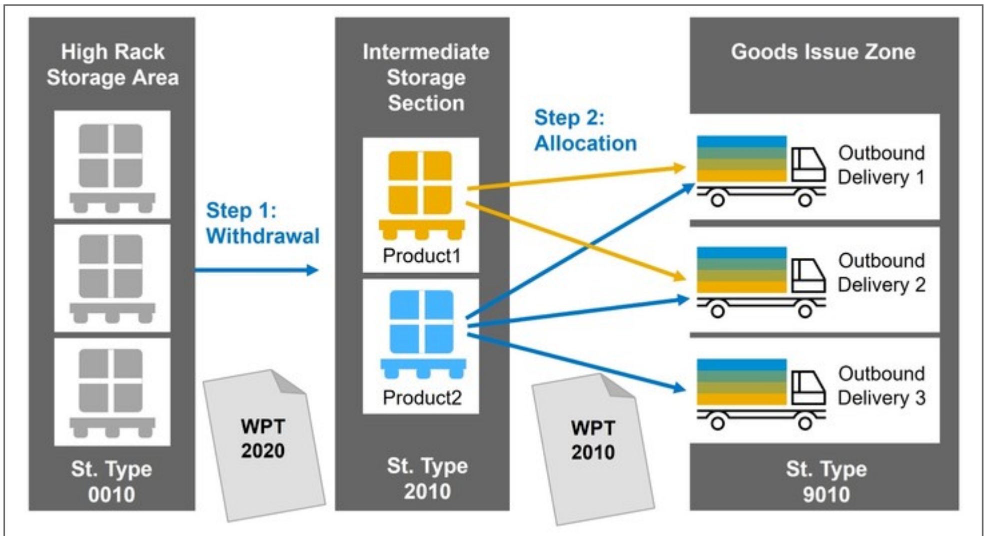


Figure 82: Two Step Picking

Picking Step One: Withdrawal

During the **first** picking step, the withdrawal, the following occurs:

1. You combine the outbound deliveries into a wave.

2. As soon as you form a group of outbound deliveries, EWM determines the relevance of the corresponding products as two-step picking. You can change the relevance of the entire wave to two-step picking by changing the value in the *Two-Step Pick* field on the user interface for wave maintenance (no entry = not relevant, 2 = two-step picking).
3. You create the withdrawal warehouse tasks for the wave, in other words, the wave release for the **withdrawal** step. To do this, on the EWM *Index* screen, choose *Extended Warehouse Management* → *Work Scheduling* → *Wave Management* → *Maintain Waves*. Select the wave and then choose the *Release Withdrawal* button. As a result, the release of the first step of picking is completed.

   The release of the withdrawal step can also be done automatically.
4. You pick the entire product quantity to fulfill the requirements from multiple deliveries.
5. You confirm the warehouse tasks for the withdrawal step, and, in doing so, you confirm that the necessary products are in the intermediate storage type.

Picking Step Two: Allocation

During the **second** picking step, the allocation, the following occurs:

1. You create warehouse tasks for the allocation step, in other words, the wave release for the allocation step. In doing so, you distribute the total quantity that has been picked among the individual requirements.
2. You transport the products that belong to a wave from the intermediate storage type to the destination storage bins (for example, to a goods issue zone or packing station).
3. You confirm the warehouse tasks for the allocation step and, in doing so, you confirm that the necessary products are in the destination storage bins.

Two-Step Picking Prerequisites

Note the following

1. You have activated two-step picking in Customizing for EWM. If you want to define the two-step process on a product basis, set the *2-Step Matl-Dep.* indicator as well. You then maintain the indicator for the products which you want to be 2-step picking relevant (on the *Warehouse Data* tab page of the warehouse product).

> Note:
> The only influencing standard factor to distinguish if 2-step picking shall be used or not, really is the product. This may not always be enough, as you might want to consider the source storage type. For this an implementation for the BAdI /SCWM/EX_WAVE_SAVE would be required.

2. You have defined a warehouse process type for the first picking step. In the standard system, the warehouse process type 2020 is defined for the first picking step.
3. You have assigned the warehouse process type for the first picking step to the warehouse number. This is in the same customizing activity where you activate the two-step picking.
4. You have created a storage type and storage bins for the intermediate storage section. In the standard system, the storage type 2010 is defined for this purpose.

5. The stock removal strategy for the second picking step must find the storage type of the intermediate storage section. You control this by setting the *2* indicator for two-step picking in Customizing for the storage type search sequence.
6. You have combined the outbound deliveries into a wave.

> Note:
> As an alternative method to reduce the number of picks from one bin, you can also check the “Combined Picking Profile”. It is not the same as 2-step picking, but with this feature you can confirm several warehouse tasks which pick a material from the same bin with one confirmation.

LESSON SUMMARY

You should now be able to:

- Implement two-step picking

Unit 6

Learning Assessment

1. Based on parameters from the outbound delivery order (ODO), the warehouse product master, and the hazardous material master data, what does the system determine?

   Choose the correct answers.

   ☐ A The storage type search sequence
   ☐ B The stock removal rule
   ☐ C Stock removal control indicator
   ☐ D Warehouse process type

2. Sorting across multiple storage types is possible by defining storage type groups.

   Determine whether this statement is true or false.

   ☐ True
   ☐ False

3. For which activities can exceptions be configured?

   Choose the correct answers.

   ☐ A For picking
   ☐ B For putaway
   ☐ C For quality inspections
   ☐ D For MFS processes

4. Which of the following attributes are available for wave template options?

   Choose the correct answers.

   ☐ A Date and time data
   ☐ B Calender
   ☐ C Release method
   ☐ D Mode

Unit 6

Learning Assessment - Answers

1. Based on parameters from the outbound delivery order (ODO), the warehouse product master, and the hazardous material master data, what does the system determine?

   Choose the correct answers.

   ☒ A The storage type search sequence
   ☒ B The stock removal rule
   ☐ C Stock removal control indicator
   ☐ D Warehouse process type

   That's correct! Based on parameters from the outbound delivery order (ODO), the warehouse product master, and the hazardous material master data, the system determines the storage type search sequence and the stock removal rule.

2. Sorting across multiple storage types is possible by defining storage type groups.

   Determine whether this statement is true or false.

   ☒ True
   ☐ False

   That's correct! Sorting across multiple storage types is possible by defining storage type groups.

3. For which activities can exceptions be configured?

   Choose the correct answers.

   ☒ A For picking
   ☒ B For putaway
   ☒ C For quality inspections
   ☒ D For MFS processes

   That's correct. Exceptions can be configured for picking and putaway movements, as well as for internal tasks, for process steps like quality inspection, and for errors received from an MFS.

4. Which of the following attributes are available for wave template options?

Choose the correct answers.

☒ A Date and time data

☒ B Calender

☐ C Release method

☒ D Mode

That's correct! Date and time data, calender, and mode are available for wave template options.

UNIT 7

Storage Control

Lesson 1

Outlining Storage Control 150

Lesson 2

Configuring Process-Oriented Storage Control 152

Lesson 3

Understanding Layout-Oriented Storage Control 157

UNIT OBJECTIVES

- Describe the types of storage control in SAP EWM
- Describe and execute process-oriented storage control
- Describe layout-oriented storage control

Unit 7
Lesson 1

Outlining Storage Control

LESSON OVERVIEW

In this lesson, you learn about types of storage control in EWM.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Describe the types of storage control in SAP EWM

Storage Control Types

In SAP EWM, products can be put away directly or through the use of storage control. Storage control determines how product movements are performed in the warehouse. Storage control executes complex putaway or stock removal process steps in the warehouse based on the physical layout of the warehouse.

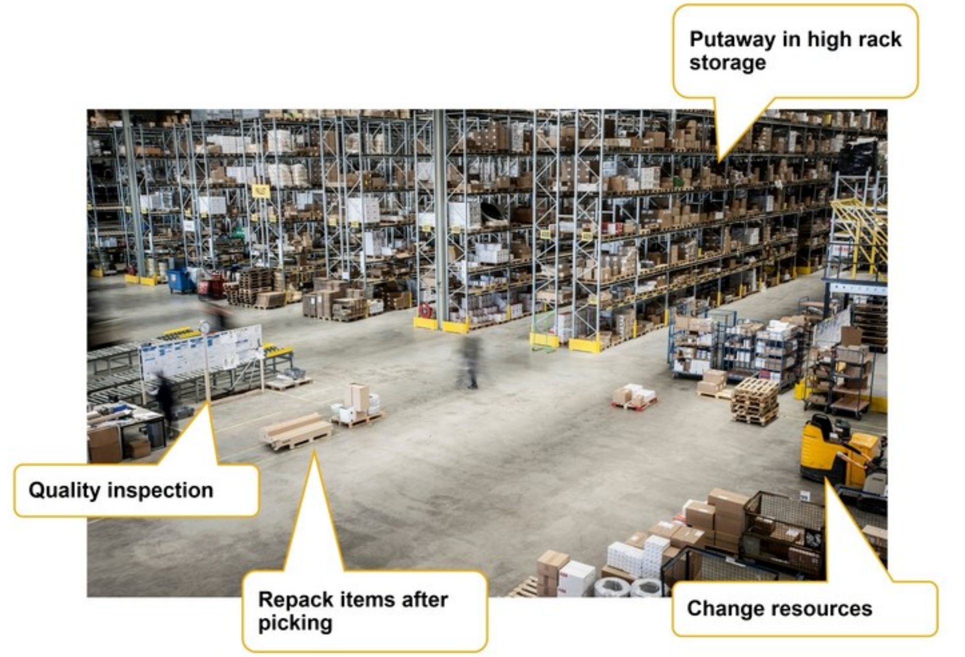


Figure 83: A Complex Warehouse Requires Complex Movements

In addition to the basic process of receiving a product quantity into the warehouse and putting it away in a storage bin, many warehouses have additional processing requirements including the following:

- Unloading
- Counting
- Quality inspection
- Deconsolidation (unpacking into individual HUs)
- Kitting
- Value added services

EWM Putaway and Picking Process

The EWM putaway and picking process takes into account your warehouse arrangement (for example, putaway using identification points in a high rack storage area) as well as the process-oriented rules and process flows as defined in Customizing, such as counting requests and repacking.

There are two forms of storage control:

1. Process-oriented
2. Layout-oriented

You can use a combination of **process-oriented**and **layout-oriented**methods for storage control. During putaway or stock removal, an individual process step can be executed on a single level basis or a multilevel basis (that is, through intermediate storage types). SAP EWM always determines the **process-oriented**storage control first. The **layout-oriented**storage control then checks whether the sequence of putaway process steps is possible in layout view, and if required, adjusts the flow of the putaway or stock removal.

LESSON SUMMARY

You should now be able to:

- Describe the types of storage control in SAP EWM

Unit 7
Lesson 2

Configuring Process-Oriented Storage Control

LESSON OVERVIEW

In this lesson, we cover the use of process-oriented storage control in an EWM warehouse. You learn how to configure this technique to accurately map the physical movements of the products in your warehouse.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Describe and execute process-oriented storage control

Process-Oriented Storage Control Basics

Process-oriented storage control is used to map complex putaways or stock removals. In addition to the basic process of receiving a product quantity into the warehouse and putting it away in a storage bin or taking a product out of the bin and dispatching it, often warehouses have additional processing requirements based on the nature of the products being managed.

It may be required to go through several process steps during the goods receipt or goods issue process. You combine all these individual storage process steps into one storage process. You can also trace the status of the individual process steps.

Inbound process steps include unloading, counting, deconsolidation, quality inspection, value added services (VAS), and putaway. Outbound process steps include picking, packing, VAS, staging, and loading. Process-oriented storage control is also possible for internal processes.

Process-oriented storage control only works with handling units.

Process-Oriented Putaway Process

The following figure shows a process-oriented putaway process:

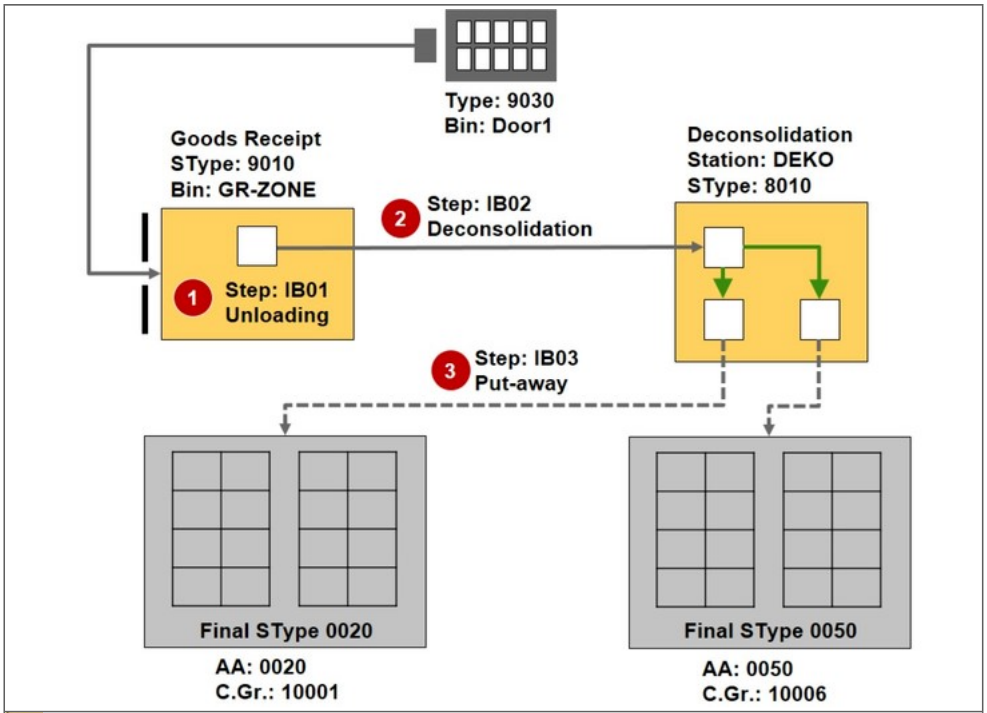


Figure 84: Process Oriented Storage Control For Deconsolidation

The process executes as follows:

1. The transportation unit arrives at the warehouse door (St. Type: 9030, Bin: Door1).
2. A task is created to move the HUs from the door to the goods receipt staging area (St. Type: 9010, Bin: GR-ZONE). Either with the creation or the confirmation of this task, the system creates warehouse tasks for products inside the HU for the final destination bins. In case there is only one product inside the HU, this warehouse task would be immediately active and the following steps would not be required.
3. There are multiple products in the HU, so the system generates a task to send the HU to the deconsolidation work center (St. Type: 8010).
4. In the deconsolidation work center, the products are repacked into separate HUs.
5. The system activates the previously created tasks to move the deconsolidation products to their final putaway bin.

Determination of Deconsolidation

In the example, the system determined that deconsolidation was required based on the fact that the consolidation group determined from the putaway location for each product was different. The following figure shows this scenario:

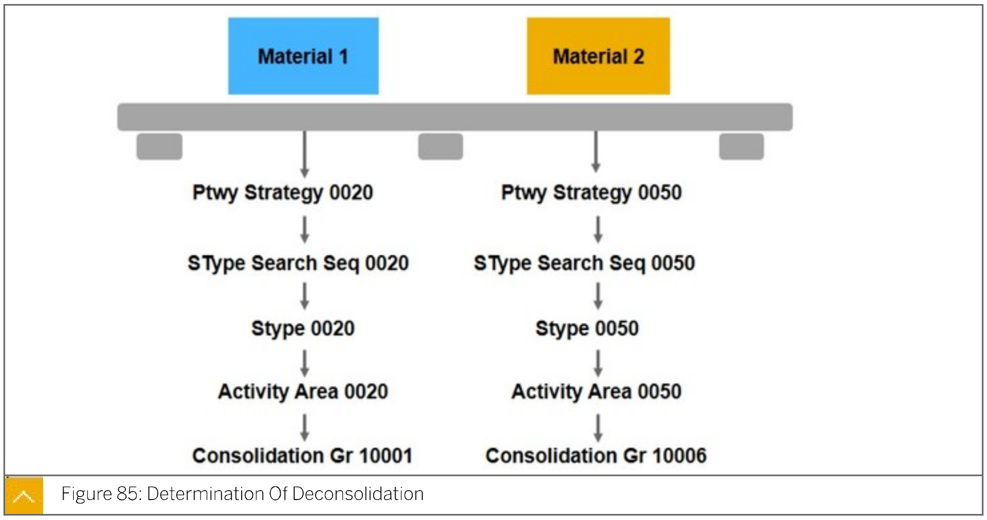


Figure 85: Determination Of Deconsolidation

In this figure, for each material, the system determines a putaway strategy that determines the putaway bin location (St. Type-Section-Bin). The putaway location determines the activity area (bins are assigned to activity areas). A deconsolidation group is assigned to each activity area. If they are different for products in the same HU, the HU must go to deconsolidation.

Configuration Settings

Based on different processing requirements of the products in your warehouse, you define the process-oriented storage control as part of the configuration settings.

Generally, the approach to configuring process-oriented storage control is to first define the warehouse process steps that are applied to your products. You define *External Process Steps*, which are connected to an *Internal Process Step* (defined by SAP). The internal process steps cannot be altered or supplemented with your own. The following figure illustrates the external to internal process step assignment:

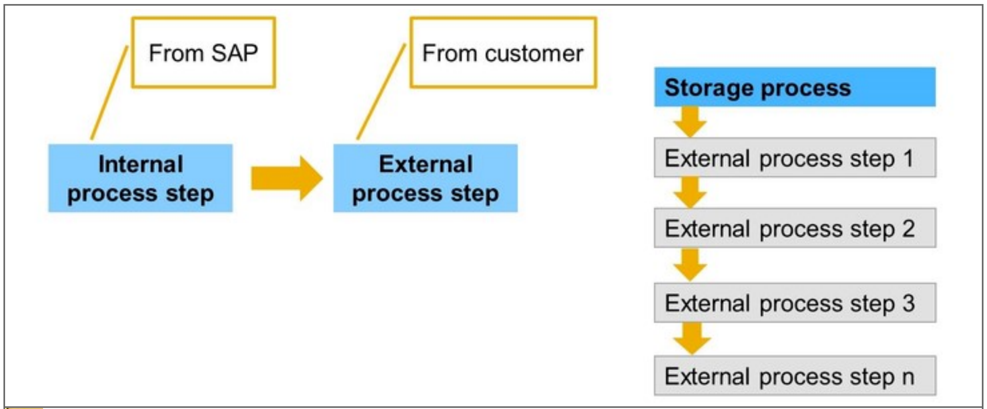


Figure 86: Process-Oriented Storage Control

The storage process is a combination of individual external storage process steps, through which the product passes as part of its complex goods receipt or goods issue process. Storage processes are configured for each warehouse. You can configure a storage process in Customizing for *SCM Extended Warehouse Management* , in *Extended Warehouse Management → Cross-Process Settings → Warehouse Task → Define Process-Oriented Storage Control*.

Each storage process step represents a potential movement in the warehouse. The SAP EWM system uses logic related to the internal processes to determine whether a warehouse task will be or can be created.

The *Auto WT* setting on the process step determines whether the subsequent warehouse task will be created or not. If the *Auto WT* setting is not made, the warehouse task will have to be created manually.

> Note:
> In most cases it will make sense to have the subsequent WT created automatically. A scenario where this might not be, is that after the *Staging* step, you want the *Loading* WT to be created manually, because that shall only happen once the truck for pickup has arrived.

The *Prod/HU WT* setting controls when during a putaway process the product warehouse task (which is the final process step during putaway) are to be created. In a picking process the first process step is always a product warehouse task, so it is not necessary to set this flag. The other process steps in the process use HU warehouse tasks.

The system uses the time-related entries in the process step to compute an estimate of the total processing time in Labor Management planning.

The external storage process step is also used to determine the destination location in the warehouse task generated by the step. You can either directly maintain a destination storage bin or use a rule-based determination. You can also enter a warehouse process type for the external step, which is used to create the corresponding WT.

Storage Process Determination

The storage process is determined depending on the direction of the warehouse request. For inbound movements, the storage process comes directly from the warehouse process type determined in the warehouse request. For outbound delivery orders, the storage process is part of the warehouse order creation rule (which is explained in a separate unit).

You can enter process steps to a storage process only in a specific sequence.

For the putaway process, this is as follows (the list shows the internal process steps):

1. Unload
2. Count
3. Deconsolidation
4. Quality inspection
5. Value-added service (VAS)
6. Putaway

For the stock removal process, this is as follows:

1. Remove from stock
2. Value-added services (VAS)

3. Pack
4. Stage
5. Load

LESSON SUMMARY

You should now be able to:

- Describe and execute process-oriented storage control

Unit 7
Lesson 3

Understanding Layout-Oriented Storage Control

LESSON OVERVIEW

While process-oriented storage control focuses on the movement of products in the warehouse based on required processing, layout-oriented storage control is used to make sure the products are moving accurately based on the physical layout and constraints of the warehouse. In this unit we cover the concepts and configuration of layout-oriented storage control. In addition, the use of combined process and layout-oriented storage control is addressed in this lesson.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Describe layout-oriented storage control

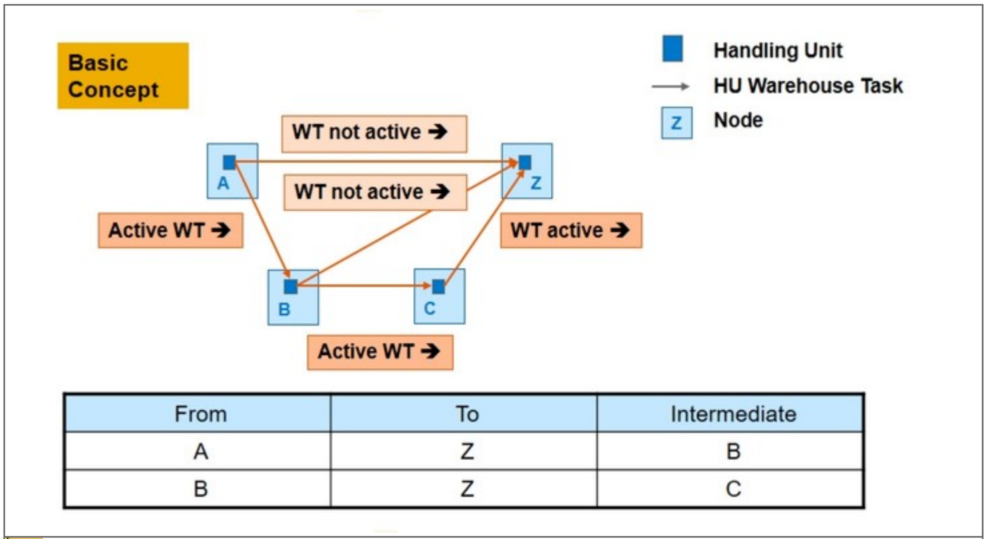
Layout-Oriented Storage Control

Based on the layout and automated storage retrieval systems in your warehouse, goods do not travel directly from the source storage location to the destination location. Instead, they move via an intermediate location, such as an identification point or pick point that is defined using layout-oriented storage control.

Layout-oriented storage control can only be used with handling units.

Example of Layout-Oriented Storage Control

A layout-oriented putaway scenario is illustrated in the following figure:



From	To	Intermediate
A	Z	B
B	Z	C

Figure 87: Example Layout Oriented Storage Control

In this example, a product pallet is to be moved from storage bin A to storage bin Z. But Z can not be accessed directly from A. Using the layout oriented storage control, the system determines that an interim move is relevant for a warehouse task.

The warehouse task from A to Z is created in an inactive state (“Waiting”). Based on layout-orient storage control, SAP EWM creates an additional task to move the HU to the bin B first. When this task is confirmed, the source bin of the inactive WT is changed from A to B.

As it is still not possible to move directly from B to Z, based on layout-oriented storage control, an additional warehouse task is created to move from B to C. When this task is confirmed, the original warehouse task is changed again, now the source storage bin is C. As a direct movement from C to Z is possible, the WT is also activated and can be processed.

Configuration Settings

Based on the physical layout of your warehouse, you define the layout-oriented storage control processes as part of configuration settings. You define intermediate locations (storage bins) to avoid directly moving products from a source location to a destination location during stock putaway or picking.

The intermediate storage bins are used as an identification point where incoming goods are identified or as pick point where items are picked for partial stock removal from a storage unit.

To configure layout-oriented storage control, in Customizing for *SCM Extended Warehouse Management*, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Layout-Oriented Storage Process Control* .

Fields for Layout-Oriented Storage Control

Maintain the following fields for layout-oriented storage control:

- Maintain the **source or destination storage type** settings to control whether the storage control is applicable while receiving or issuing the goods, and whether the product movement is executed via an identification or pick point.

Unit 7

Learning Assessment

1. You can use a combination of **process-oriented**and **layout-oriented**methods for storage control.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

2. In storage control definition for process-oriented storage control, you enter internal storage process steps for the putaway process in a certain sequence.

   Arrange these steps into the correct sequence.

   ☐ Unload

   ☐ Count

   ☐ Deconsolidation

   ☐ Quality Inspection

   ☐ Value-Added Services (VAS)

   ☐ Putaway

3. When you combine the process-oriented control with the layout-oriented storage control, which of the following is true?

   Choose the correct answer.

   ☐ A SAP EWM always determines the process-oriented storage control first.

   ☐ B SAP EWM always determines the layout-oriented storage control first.

   ☐ C It does not matter which type of storage control is determined first.

Unit 7

Learning Assessment - Answers

1. You can use a combination of **process-oriented**and **layout-oriented**methods for storage control.

   Determine whether this statement is true or false.

   ☒ True

   ☐ False

   That's correct. You can use a combination of **process-oriented**and **layout-oriented** methods for storage control.

2. In storage control definition for process-oriented storage control, you enter internal storage process steps for the putaway process in a certain sequence.

   Arrange these steps into the correct sequence.

   1 Unload

   2 Count

   3 Deconsolidation

   4 Quality Inspection

   5 Value-Added Services (VAS)

   6 Putaway

   That's correct! In storage control definition for process-oriented storage control, you enter internal storage process steps for the putaway process in the following order: Unload, count, deconsolidation, quality inspection, VAS, putaway.

3. When you combine the process-oriented control with the layout-oriented storage control, which of the following is true?

   Choose the correct answer.

   ☒ A SAP EWM always determines the process-oriented storage control first.

   ☐ B SAP EWM always determines the layout-oriented storage control first.

   ☐ C It does not matter which type of storage control is determined first.

   That's correct! When you combine the process-oriented control with the layout-oriented storage control, SAP EWM always determines the process-oriented storage control first.

UNIT 8

Warehouse Order Creation

Lesson 1

Creating Warehouse Orders 163

UNIT OBJECTIVES

- Create warehouse orders

Unit 8
Lesson 1

Creating Warehouse Orders

LESSON OVERVIEW

In this lesson, we cover the warehouse order creation process in EWM. We outline how warehouse tasks are grouped into warehouse orders for processing in the warehouse. The underlying configuration settings are reviewed to understand how the process can be tailored to fit implementation requirements.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Create warehouse orders

Warehouse Order Creation Overview

In EWM, the warehouse order is the document that represents an executable work package that a warehouse employee should complete within a specific time. The warehouse order consists of warehouse tasks or physical inventory items.

When products are received, picked, or moved internally, warehouse tasks are created. Warehouse tasks are grouped together into warehouse orders and SAP EWM makes them available for processing. For example, in the goods receiving process, warehouse tasks are created to move the products into the warehouse and to their destination storage bin. SAP EWM groups these tasks together, according to warehouse order creation rules (WOCRs), to form the warehouse orders. The WOCRs are defined in Customizing.

Warehouse Order Creation Process: Step Overview

The overall process that SAP EWM uses to create warehouse orders is shown in the following figure:

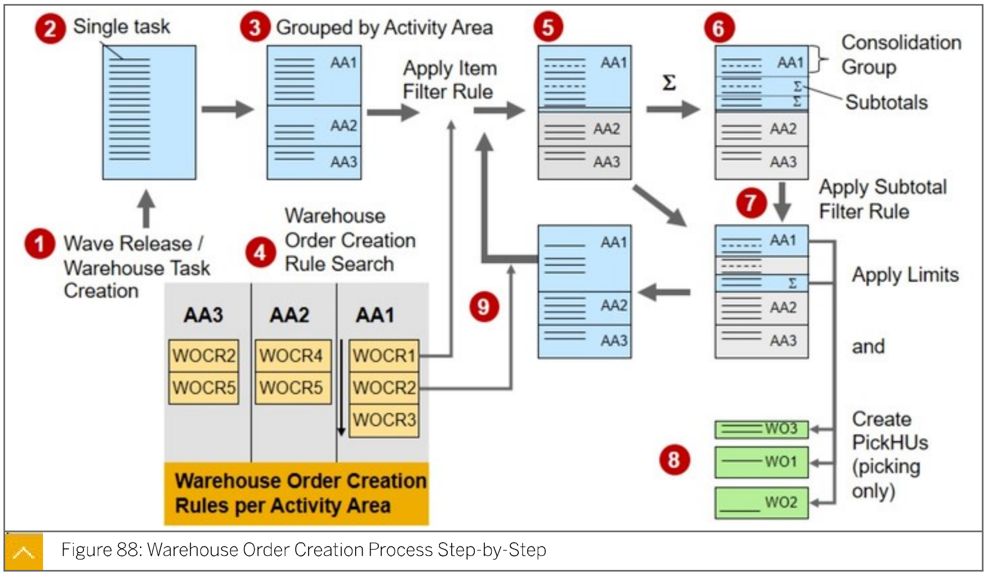

2 Single task
3 Grouped by Activity Area
5
6
AA1
AA2
AA3
Apply Item Filter Rule
Σ
Consolidation Group
Subtotals
Σ
Σ
1 Wave Release / Warehouse Task Creation
4 Warehouse Order Creation Rule Search
7 Apply Subtotal Filter Rule
Apply Limits
and
Create PickHUs (picking only)
9
8
AA3
AA2
AA1
WOCR2
WOCR5
WOCR4
WOCR5
WOCR1
WOCR2
WOCR3
Warehouse Order Creation Rules per Activity Area
WO3
WO1
WO2

Figure 88: Warehouse Order Creation Process Step-by-Step

Warehouse Order Creation: Step-by-Step Process

The SAP EWM system performs the following to create warehouse orders:

1. Process step 1 - Wave release/Warehouse task creation

   The process begins when the system releases a wave and creates warehouse tasks or when warehouse tasks are directly created, with or without a reference to a warehouse request.

2. Process steps 2 and 3 - Grouping

   The system sorts single task items and groups them by activity area. Which activity area is used for this (source or destination), is controlled by the warehouse process type.

3. Process step 4 - WOCR determination

   The system determines warehouse order creation rules based on the activity area and the activity from the warehouse process type. As soon as SAP EWM applies a WO creation rule, it sorts the warehouse tasks according to these sort rules. Sorting is used by warehouse order creation to sort the warehouse tasks that are assigned to a warehouse order. A maximum of 15 sort fields can be configured for each warehouse task sorting rule.

4. Process step 5 - Apply item filters

   The system applies item filters, which check an individual warehouse task for the defined filter criteria. Examples of filters include minimum/maximum weight, volume, processing time, and route. SAP EWM checks whether the given item filter fits. If the filter fits the warehouse task, SAP EWM continues processing for the warehouse task. If it does not fit, SAP EWM stops processing the warehouse task and goes to the next task in sequence.

5. Process steps 6 and 7 - Consolidation group and subtotal filters

   a. SAP EWM determines the consolidation group based on customizing settings that indicate the items that can be packed and shipped together in a system-guided process (step 6). This means that in the putaway process, you can work with distributive putaway, or the products can be packed together.

   b. The system can apply a filter on the subtotal level (step 7), such as limits set in Customizing.

6. Process step 8 - Apply limits and create warehouse order

   The system creates the warehouse order (step 8). The warehouse order is the work package that is assigned to the user for execution. The size of the warehouse order is controlled by defining limits, like how many items or how much weight the warehouse order should contain. Within a warehouse order, the system can again sort the warehouse tasks. For a picking process the system also can create pick HUs.

7. Process step 9 - Use the next WOCR

   This process continues using the next warehouse creation rule until all items have been processed.

Warehouse Order Creation Configuration

To configure warehouse order creation, you create a series of separate profiles that control the warehouse order creation process. These profiles are assigned to the warehouse order creation rule. This is illustrated in the following figure:

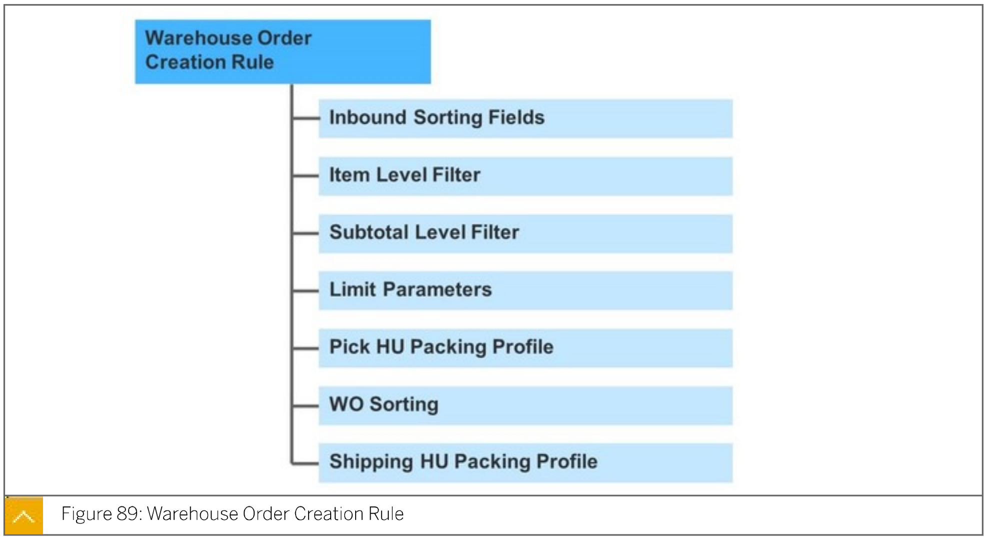


Figure 89: Warehouse Order Creation Rule

Warehouse Order Creation Rules

You can define the following rules for your warehouse:

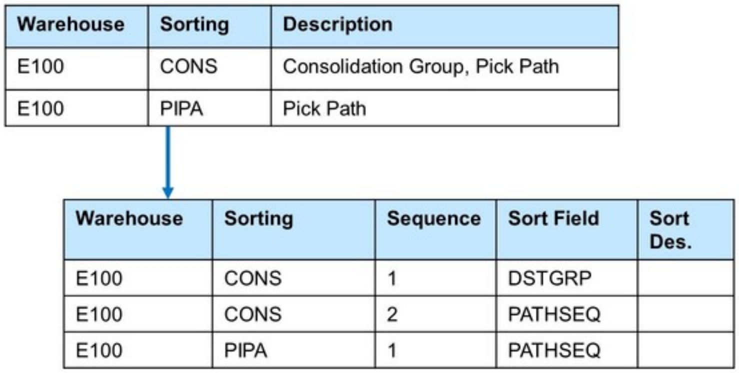
- Creation category:Set the WO creation category, such as consolidation group, pick path, pick-pack-pass, load and unload, or physical inventory.
- Item filter:Define item filters in *Define Filters for WO Creation Rules* .
- Subtotal filter:Define the subtotal filter in *Define Filters for WO Creation Rules* . WO creation uses the subtotal filter for consolidating group rules and comparing the values defined here with the corresponding subtotals at consolidation group level.
- Limit: Define the limit for the size of a WO under *Define Limit Values for the Size of a WO.*

- Inbound Sorting:Choose one of the sort sequences defined in *Define Sort Rules for Warehouse Tasks* for inbound sorting. EWM uses this sort sequence at the beginning of WO creation.
- WO Sorting:Choose one of the sort sequences defined under *Define Sort Rules for Warehouse Tasks* for sorting within a WO.
- Packing Profile:Choose a packing profile in *Define Packing Profile for WO Creation* to define the required pick-handling units.
- Ship.Pack.Profile:Choose Ship.Pack.Profile to define specific shipping handling units in WO creation.
- Preparation Time:This is the time required by an employee to prepare the processing of a warehouse order. This could include, for example, fetching the necessary paperwork or creating handling units.
- Dest.Stor:Define the destination storage type, storage section, and storage bin of the work center to which the WTs, which have been grouped using the current WO creation rule, should be taken.
- Storage Process:Defines the storage process in process-oriented storage control for outbound processes. For picking, enter a packing station as the destination for a WT by entering the destination storage type, destination storage section, and destination storage bin.
- Determine WkCtr:This indicator specifies that a work center should be determined for WOs constructed using this WO creation rule. This indicator is only effective if the WO creation rule is defined without a storage process.

Configure this rule in customizing for *SCM Extended Warehouse Management* in *Extended Warehouse Management → Cross-Process Settings → Warehouse Order → Define Creation Rule for Warehouse Orders.*

Sort Rules

The sorting of tasks to be assigned to warehouse orders is controlled by a sort profile. Each sort profile can specify a list of up to 15 fields for sorting. A sort profile is illustrated in the following figure:



Warehouse	Sorting	Description
E100	CONS	Consolidation Group, Pick Path
E100	PIPA	Pick Path

Warehouse	Sorting	Sequence	Sort Field	Sort Des.
E100	CONS	1	DSTGRP	
E100	CONS	2	PATHSEQ	
E100	PIPA	1	PATHSEQ	

Figure 90: A WOCR Sort Profile

The following are characteristics and functions controlled by the sort profile.

- The sequence number, assigned by EWM, defines the sequence of the sort criteria. You can change this sequence.
- The sort field defines how EWM should sort the WTs of the warehouse order. SAP has predefined the sort fields.
- Select *Sort Des.* (*Descending*) if you want EWM to sort the WTs in descending order according to the sort criteria (for example, descending by weight or volume).

Item and Subtotal Filters

In Customizing, you define the filters for the warehouse order creation rules. Warehouse order creation uses the filters on all WTs to be processed that you have not yet assigned to a warehouse order.

The filter parameters are illustrated in the following figure:

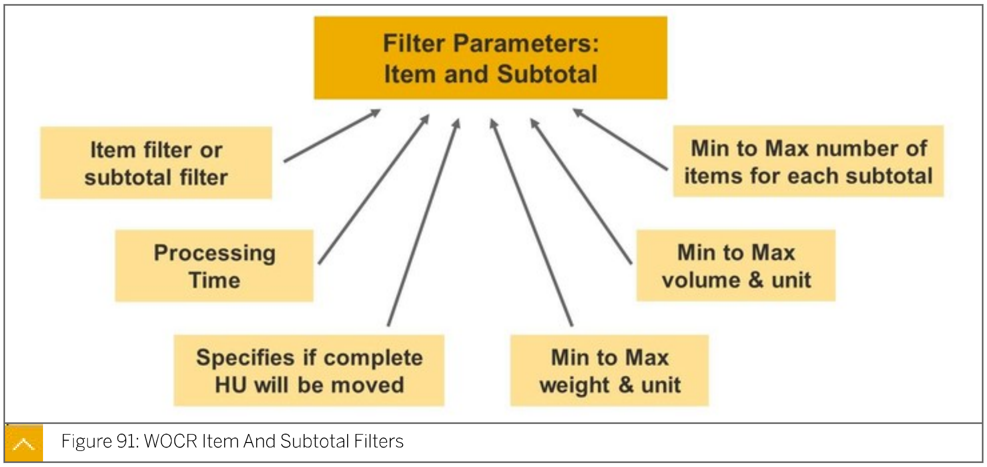

Filter Parameters: Item and Subtotal
Item filter or subtotal filter
Processing Time
Specifies if complete HU will be moved
Min to Max weight & unit
Min to Max volume & unit
Min to Max number of items for each subtotal

Figure 91: WOCR Item And Subtotal Filters

Define your filters for the warehouse number and enter a filter for warehouse order creation (you select the filter type and define your item filters or subtotal filters).

Limit Parameters

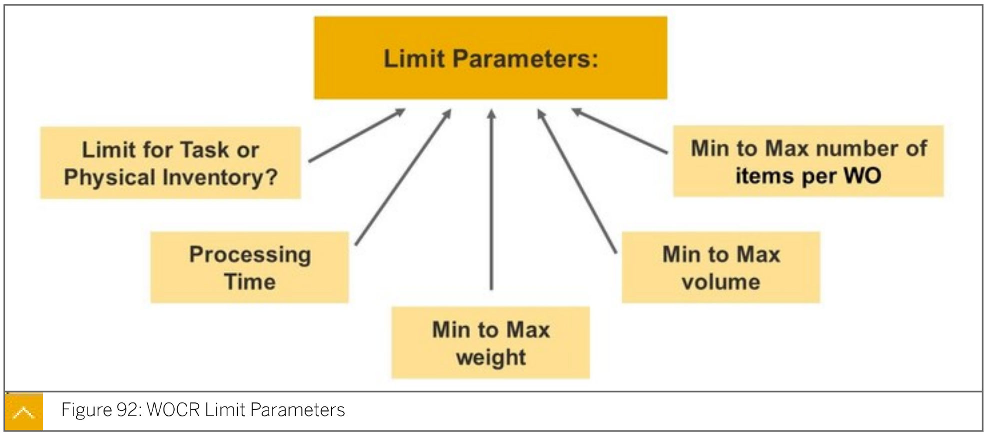

Limit Parameters:
Limit for Task or Physical Inventory?
Processing Time
Min to Max weight
Min to Max volume
Min to Max number of items per WO

Figure 92: WOCR Limit Parameters

The *Limit Parameters* profile contains the information used to control the size/scope of the warehouse order. Using this profile, you restrict the number of tasks assigned to a warehouse order. As soon as a value exceeds the defined limit, warehouse order creation completes the current warehouse order with all the warehouse tasks processed to that point in the process. For the remaining warehouse tasks, the system creates another warehouse order.

After warehouse order creation has checked the values for the maximum limits, it checks the values for the minimum limits. If these limits are not reached, the system cannot process the WTs using the current warehouse order creation rule. If necessary, the system processes these warehouse tasks using different WOCRs according to the search sequence for warehouse order creation rules for each activity area and/or activity type.

You can configure the Limit Parameters profile in Customizing for *SCM Extended Warehouse Management* in *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Order* → *Define Limit Values for the Size of a Warehouse Order* .

Packing Profile

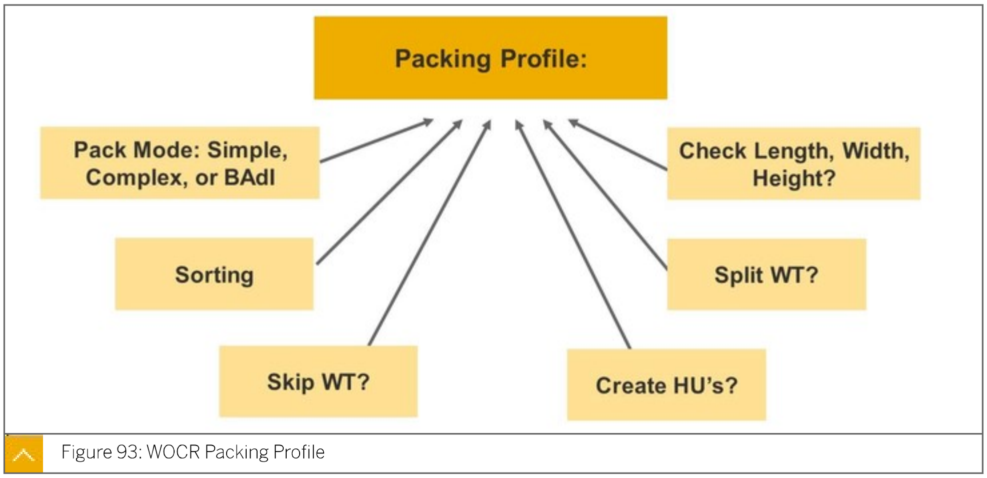

Packing Profile:
Pack Mode: Simple, Complex, or BAdI
Check Length, Width, Height?
Sorting
Split WT?
Skip WT?
Create HU's?

Figure 93: WOCR Packing Profile

You can create a profile that determines pick handling units for the warehouse order. The system uses the data from the warehouse tasks such as weight, volume, or dimensions to determine the pick handling units. It compares this data to the possible packaging materials and determines the number and category of the required handling units.

Packing Profile Configuration

The following fields comprise the packing profile:

- Packing mode:Choose either simple algorithm, complex algorithm, or the use of a BAdI. With the simple algorithm, you can only define one packaging specification with one packaging material per packing profile. The complex algorithm uses multiple possible packaging specifications to determine the optimum pick handling units from the various packaging materials, and their number.
- Sorting: Specify the sort sequence that you previously defined in *Define Sort Rules for Warehouse Tasks* . Before determining the pick-handling units, warehouse order creation sorts the WTs according to this predefined sort sequence.
- Create HUs: Select this indicator if you want EWM to create the proposed handling units automatically. Do not set this indicator if EWM should propose the packaging material, but should not create the HU.

- **Split WT During Packing** Select this field if you want EWM to split warehouse tasks during determination of a packing proposal for optimum filling of a handling unit. Choose *Do Not Split*, if EWM should not split warehouse tasks. Choose WT *Split*, if EWM should partially split a warehouse task that is too large for the largest given packaging material type. Choose *Always Split*, if EWM should always split warehouse tasks to fill pick handling units as completely as possible.
- **Skip WT**: Select this indicator if EWM should skip a warehouse task that no longer fits into the pick handling unit. EWM then continues processing from the next warehouse task.
- **Check LWH**: Select this if you want EWM to take length, width, and height into consideration when determining a packing proposal for the warehouse order.

You can configure the packing profile in Customizing for *SCM Extended Warehouse Management*, in *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Order* → *Define Packing Profile for Warehouse Order Creation* .

Warehouse Order Creation Rules Determination

After the various WOCR profiles have been created, they are combined into a warehouse order creation rule. The final step in WOCR configuration is to assign the WOCRs to the activity area and/or activity. This process is illustrated in the following figure:

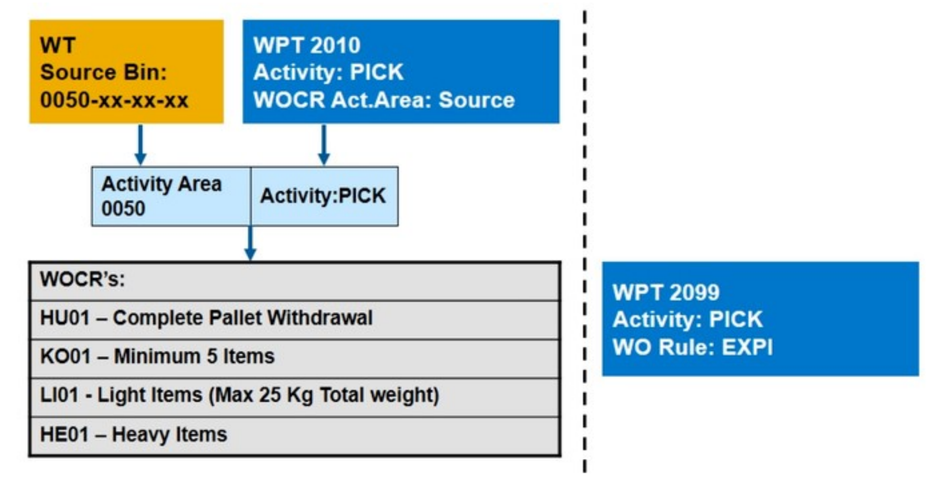


Figure 94: WOCR Determination vs. Direct Assignment

In customizing, you define the search sequence of the WO creation rule for activity areas. You can assign one or more WO creation rules to each defined activity area or combination of activity area and activity. These rules are processed during WO creation for each activity area, according to the sequence defined.

The activity area is determined from either the source or destination bin in the warehouse task. This choice is controlled based on a setting in the warehouse process type. The *Activity* is determined from the warehouse process type.

You can configure the search sequence in Customizing for *SCM Extended Warehouse Management* in *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Order* → *Define Search Sequence of Creation Rules for Activity Areas* .

You can also enter just one WOCR directly in the warehouse process type, if this is sufficient for your requirements.

Warehouse Order Creation Rules

In customizing, you can see an overview of a WO creation rule, including information about the following settings that you have defined:

- Filter at item level (in *Define Filters for WO Creation Rules*)
- Filter at subtotal level (in *Define Filters for WO Creation Rules*)
- Limit values (in *Define Limit Values for the Size of a WO*)
- Inbound sorting (in *Define Sort Rules for Warehouse Tasks*)
- WO sorting (in *Define Sort Rules for Warehouse Tasks*)
- Pick-HU packing profile (in *Define Packing Profit for WO Creation*)
- Shipping HU packing profile (in *Define Packing Profile for WO Creation*)

You can view this overview in Customizing for *SCM Extended Warehouse Management* , in *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Order* → *Overview of Creation Rules for Warehouse Orders* .

Warehouse Order Creation Rules for Physical Inventory

For the creation of physical inventory documents SAP EWM also can use warehouse order creation rules to control the volume of a physical inventory document which is assigned to a user. A rule with the *Creation Category Physical Inventory* only uses a small number of the elements available for the warehouse order creation.

- Item Filter

  The item filter for physical inventory is only at item level and only filters items for the priority and the reason for movement (you can assign standard reasons to physical inventory documents, this reason also has a priority).

- Limit

  Limit values for PI documents can only be minimum or maximum number of items.

- Sorting

  You can assign an inbound sorting and a item sorting rule to the physical inventory warehouse order creation rule.

Two things are special about the warehouse order for physical inventory:

- The limit rule for the PI document does not control the size of the physical inventory document itself, but only how many items of the PI document are combined in a warehouse order.
- When processing the PI documents with mobile devices, the status of the warehouse order which includes the PI items is *D - In Process* when the items have been count. It only changes to *C - Confirmed* when the physical inventory status of the items is *Posted* .

Predefined Warehouse Order Creation Rules

SAP EWM contains two predefined warehouse order creation rules. These rules can not be customized and are used as fallback.

> The WOCR *UNDE* is used for warehouse tasks which are left when the customer defined WOCRs have been processed.

The WOCR *DEF* is used if no WOCR is assigned to the activity area / activity or the warehouse process type.

These standard rules have no limits, except that all warehouse tasks in one warehouse order must have the same activity area, queue, and are for the same warehouse request.

LESSON SUMMARY

You should now be able to:

- Create warehouse orders

Unit 8

Learning Assessment

1. The warehouse order creation process for picking waves begins with the system creating a list of warehouse requests. Put the rest of the steps in the correct order:

   Arrange these steps into the correct sequence.

   ☐ The warehouse request items are grouped into a wave.

   ☐ The system releases the wave that creates warehouse tasks.

   ☐ WOs are created according to the WOCR defined in Customizing.

   ☐ The system determines the WOCR from the activity area.

Unit 8

Learning Assessment - Answers

1. The warehouse order creation process for picking waves begins with the system creating a list of warehouse requests. Put the rest of the steps in the correct order:

   Arrange these steps into the correct sequence.

   1 The warehouse request items are grouped into a wave.

   2 The system releases the wave that creates warehouse tasks.

   4 WOs are created according to the WOCR defined in Customizing.

   3 The system determines the WOCR from the activity area.

   That's correct! The warehouse order creation process for picking waves begins with the system creating a list of warehouse requests. Next, the warehouse request items are grouped into one wave. Based on the wave, the system then creates numerous warehouse tasks. All tasks will pass the Black Box warehouse order creation process. The system determines the WOCR from the activity area, and WOs are created according to the WOCR defined in Customizing.

UNIT 9

Posting Changes, Stock Transfers, and Replenishment

Lesson 1

Performing Posting Changes and Stock Transfers 175

Lesson 2

Performing Ad Hoc Movements and Replenishment 179

UNIT OBJECTIVES

- Perform posting changes and stock transfers
- Perform ad hoc movements and replenishment

Unit 9
Lesson 1

Performing Posting Changes and Stock Transfers

LESSON OVERVIEW

In this lesson, we outline the types of warehouse and inventory management related movements: posting changes and stock transfers. Posting changes deal primarily with a change in quant characteristics; whereas, stock transfers deal with the physical movement of products from within the same warehouse or from one warehouse to another.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Perform posting changes and stock transfers

Posting Changes

A posting change is a change in a quant characteristic field, such as *Unrestricted Stock to Quality Inspection Stock*, or a change in the product or batch number. Generally, the physical location of the stock does not necessarily change.

An example of a posting change is the release of stock from inspection into unrestricted stock or vice versa. A posting change can be triggered from ERP or within EWM. The following figure shows the various process flows related to posting changes:

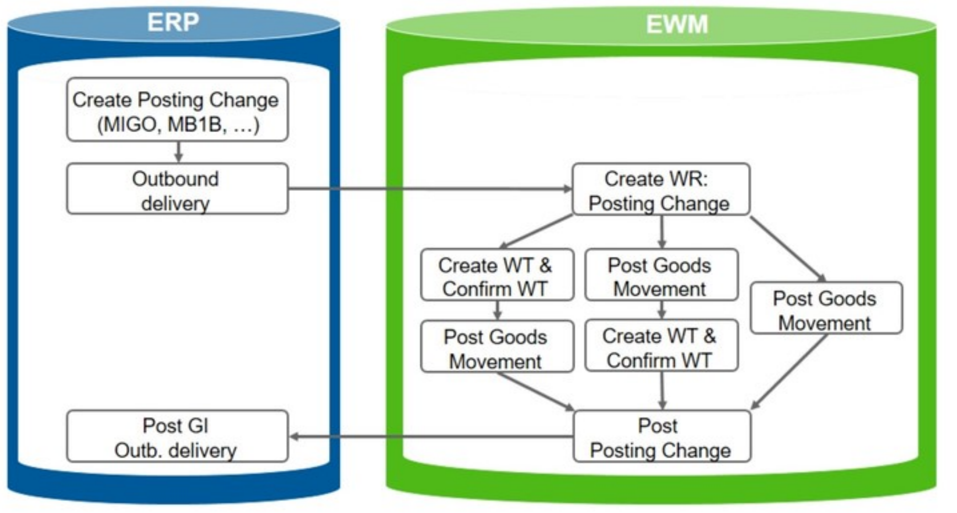


Figure 95: Posting Change Process

In this process flow, the posting change originates in the ERP system from either a `MIGO` or `MB1B` transaction. Both of these postings cause an outbound delivery document to be created. This document is replicated to the EWM system as a warehouse request document.

Note:
In a decentralized EWM system the system can also create the interim document, a posting change request, first. This is not pictured on the slide.

Warehouse Process Type Posting Change Settings

Based on settings in the warehouse process type, the posting change can be posted directly during creation of the warehouse request, or a warehouse task can be created for the posting change. The field *Post. Change in Bin* has the options:

- Posting Change always in Storage Bin

  For this the system requires a source determination based on the available information (like the WPT) and triggers a posting change immediately.

- Posting Change never in Storage Bin (Create Warehouse Task)

  The system requires a WT for the posting change. If you do not enter the source and / or the destination bin, the system requires a source (picking) and / or destination (putaway) determination accordingly.

- Posting Change According to Storage Type Setting

  In the storage type a similar field is available. Here the options are:

  - Posting Change Always in Storage Bin
  - No Posting Change in Storage Bin (Create Warehouse Task)
  - Posting Change According to Mixed Storage Setting

    If the posting change would create a mixed storage and it is allowed, no WT is required. If mixed storage is not allowed, a WT would be required.

When the option *Posting Change never in Storage Bin (Create Warehouse Task)* the field *Goods Mvmnt Before Warehouse Task* controls if the posting change is happening in the source or in the destination bin of the warehouse task. If you post the goods movement before the warehouse task, the source storage type must allow mixed storage.

To get the system to create a posting change warehouse request document in EWM for the ERP outbound delivery, you map the ERP document type to an EWM posting change type. To make this mapping, go to Customizing for *SCM Extended Warehouse Management* , in *Extended Warehouse Management → Interfaces → ERP Integration → Delivery Processing → Map Document Types from ERP System to EWM* .

You also map the ERP item categories to the EWM item types.

Posting Change Created in SAP EWM

You can also create a posting change directly in SAP EWM. The goods movement for posting changes created directly in SAP EWM is communicated to SAP ERP via the goods movement interface as shown in the following figure:

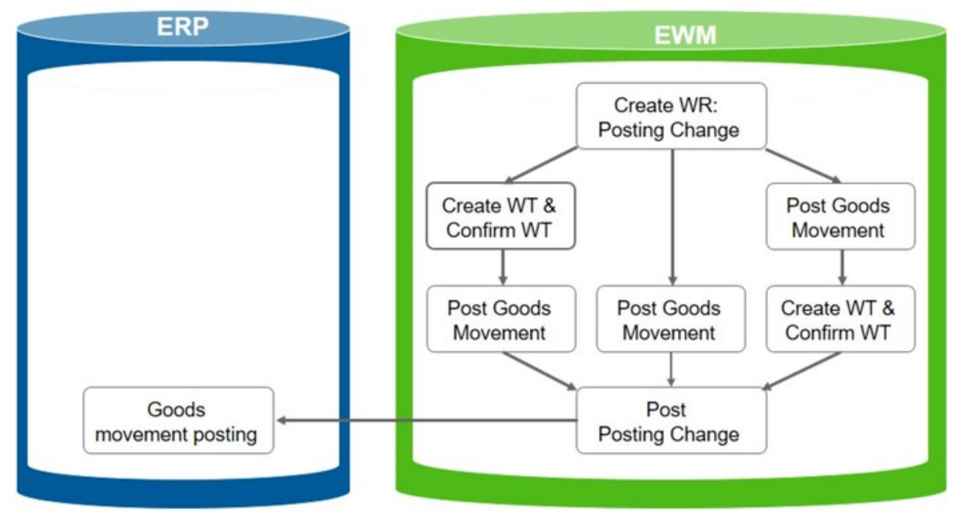


Figure 96: Process For Posting Change Created In EWM

Using the `/SCWM/POST` transaction, you can create either a direct posting change or a posting change via a warehouse request document (from the warehouse request document you then create the warehouse tasks).You can change a destination bin during a posting change only by using a warehouse request document and a subsequent warehouse task.

You can also create posting changes directly in the *Warehouse Management Monitor* (in the node *Physical Stock*). Different changes can be triggered (like stock type, product, or stock owner), but you can not choose what shall happen in the same way as in the transaction /SCWM/POST, the system always creates a posting change warehouse task.

The goods movement posting (Warehouse material document) is a warehouse task with category 7 (posting change) and can be viewed in the Warehouse Management Monitor.

Stock Transfer

A transfer of stock to another storage location or plant can be created in ERP. If the source storage location is connected to an EWM warehouse, the process in the following figure is performed:

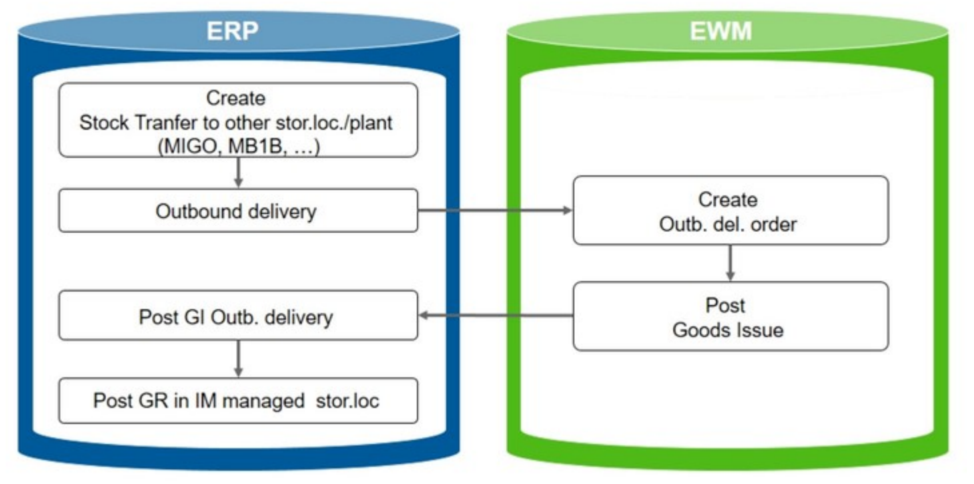


Figure 97: Stock Transfer

If the storage location is not EWM-managed, the GR can be posted in the destination storage location together with the GI posting of the outbound delivery in ERP (movement type 311).

Two-Step Stock Transfer

You can also create a two-step stock transfer (either using the `MIGO` or `MB1B` transaction codes) or a stock transport order (movement type 313/315), where the stock is posted with the GI posting into transit stock, and from transit into the new storage location. This process is shown in the following figure:

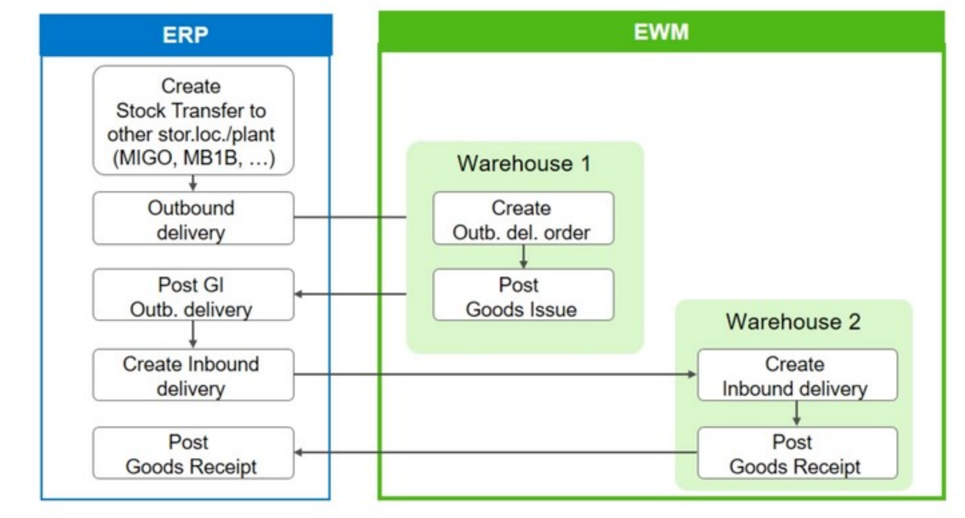


Figure 98: Stock Transport Order Process–Multiple Warehouses

LESSON SUMMARY

You should now be able to:

- Perform posting changes and stock transfers

Unit 9
Lesson 2

Performing Ad Hoc Movements and Replenishment

LESSON OVERVIEW

Ad hoc movements and replenishment strategies provided by EWM are covered in this lesson. Ad hoc movements are movements that you create without a reference to a preceding document. They normally involve a movement of a quantity from one bin to another. Replenishment is a warehouse process that is implemented to ensure that stocks in picking bins are available when needed.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Perform ad hoc movements and replenishment

Internal Stock Transfers

Internal stock transfers can be created for several internal warehouse processes in EWM, such as replenishment or rearrangement.

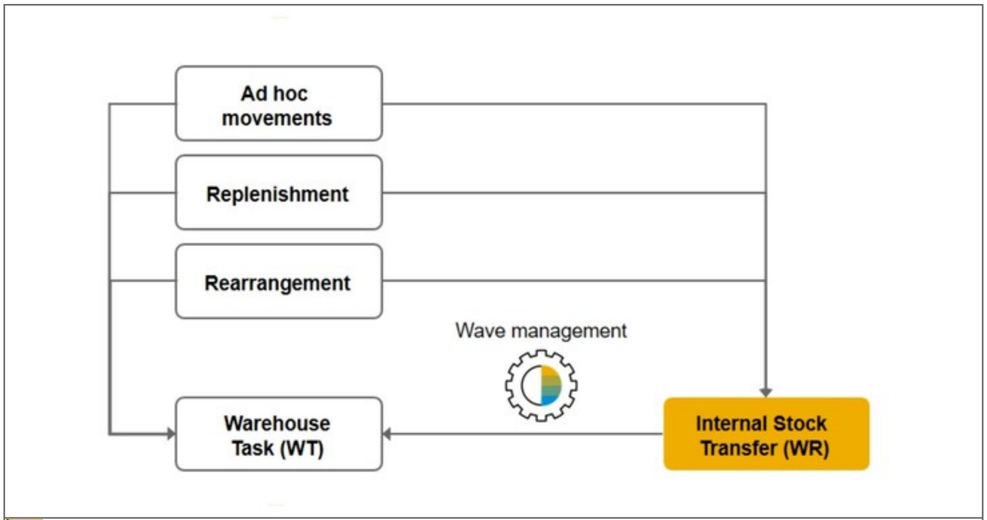
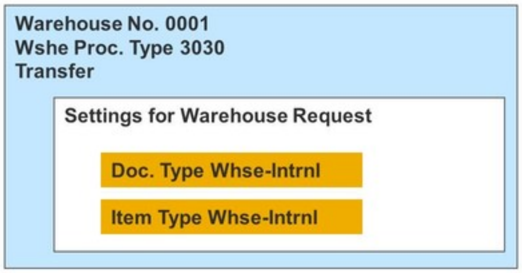


Figure 99: Processes with Internal Stock Transfers

Ad Hoc Movements

Ad hoc movements are movements that you create without a reference to a preceding document. Using the ad hoc movement transactions (`/SCWM/ADPROD` and `/SCWM/ADHU`) you can create either a warehouse task (product or HU) or an internal stock transfer (warehouse request).

For each warehouse process type, you can define the document and item type for the warehouse request being created. The relevant settings are shown in the following figure:



Warehouse No. 0001
Wshe Proc. Type 3030
Transfer

Settings for Warehouse Request

Doc. Type Whse-Intrnl

Item Type Whse-Intrnl

Figure 100: Warehouse Process Type Settings for Ad Hoc Movements

You can also create product warehouse tasks directly in the *Warehouse Management Monitor* (node: *Available Stock*).

Replenishment

To ensure that you have adequate stock on hand for picking, you can use the replenishment process to fill picking bins from one or more reserve storage types.

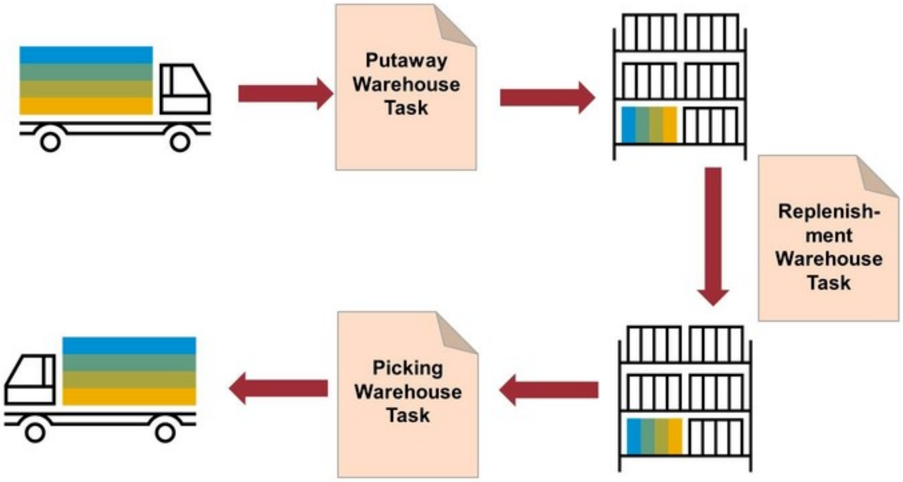


Figure 101: Replenishment Process

In configuration, you can decide, for example, if warehouse tasks should be created, or, if as a first step, only the warehouse request should be created. This internal stock transfer can be used to schedule several replenishment in waves or to plan the execution of replenishment separately from the requirements, for example, replenishment that are only executed at night. Replenishment planning can be done automatically as a regular background job, or you can start the transaction manually and enter all required data.

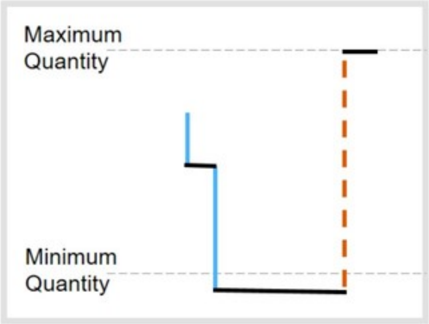
For each storage type you define the allowed replenishment types. There are four basic methods of replenishment:

- Planned replenishment
- Automatic replenishment

- Order-related replenishment
- Direct replenishment

> Note:
> You will find a fifth replenishment method in Customizing and the replenishment transaction, *Crate Part Replenishment* . This method is only used for production supply.

Planned Replenishment



→ Started in Online or Batch Mode

→ Calculates Replenishment according to Maximum and Minimum Quantity

→ Only Started when Stock figure is lower than the Minimum Quantity

→ Round down to Multiples of Minimum Replenishment Quantity

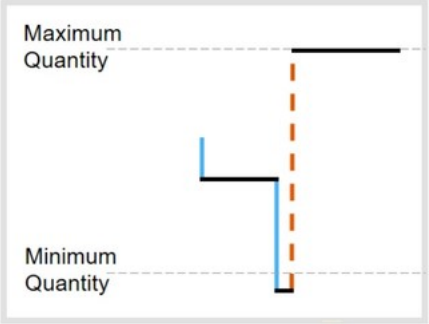
Figure 102: Planned Replenishment

You can start planned replenishment interactively or start it in the background.

The system calculates replenishment in accordance with the defined minimum quantity and maximum quantity. Replenishment is triggered when the stock is less than the minimum quantity.

The system rounds down the replenishment quantity (the quantity of the warehouse task or warehouse request) to a multiple of the minimum replenishment quantity, if such a quantity is maintained.

Automatic Replenishment



→ Started during WT Confirmation

→ Calculates Replenishment according to Maximum and Minimum Quantity

→ Only Started when Stock figure gets lower than the Minimum Quantity

→ Round down to Multiples of Minimum Replenishment Quantity

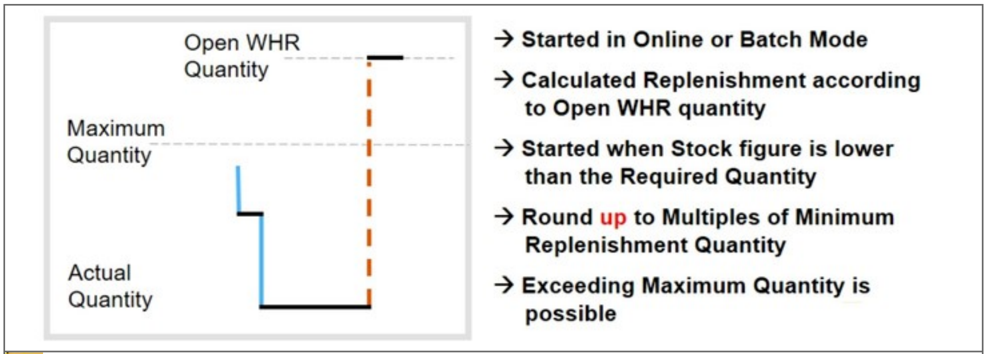
Figure 103: Automatic Replenishment

The system starts automatic replenishment in the background when a warehouse task is confirmed.

The system calculates replenishment in accordance with the maximum and minimum quantity. Replenishment is triggered when the stock is less than the minimum quantity after the confirmation of a picking warehouse task.

The system rounds down the replenishment quantity to a multiple of the minimum replenishment quantity, if such a quantity is maintained.

Order-Related Replenishment



- → **Started in Online or Batch Mode**
- → **Calculated Replenishment according to Open WHR quantity**
- → **Started when Stock figure is lower than the Required Quantity**
- → **Round up to Multiples of Minimum Replenishment Quantity**
- → **Exceeding Maximum Quantity is possible**

Figure 104: Order-Related Replenishment

You can start order-related replenishment interactively or start it in the background. The goal in order-related replenishment is to ensure that open outbound deliveries can be fulfilled.

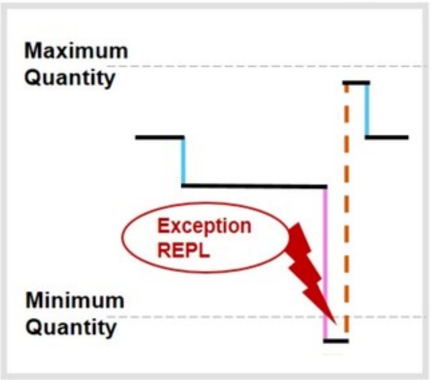
The system calculates the replenishment quantity in accordance with the quantity required on open warehouse requests. Replenishment control is triggered when the stock is less than the required quantity.

The system rounds up the replenishment quantity to a multiple of the minimum replenishment quantity, if such a quantity is maintained. The maximum quantity can be exceeded with replenishment.

The main feature of the order-related replenishment method is that it takes into account all open warehouse request quantities according your selection.

Note:
To use order-related replenishment, it is also necessary to set the *Rough Withdrawal Bin Determination in Warehouse Request* flag in the warehouse process type used in the warehouse requests.

Direct Replenishment



→ Started during a Pick Denial when Exception Code points to the Internal Process Code "Replenishment"

→ Only possible for Fixed Bin Scenario

→ Calculated Replenishment according to Maximum and Minimum Quantity

→ Assume that Bin Quantity is Zero

→ Round down to Multiples of Minimum Replenishment Quantity

→ Picker performs the Replenishment (*Picker Directed Replenishment*)

Figure 105: Direct Replenishment

Direct replenishment is started during a bin denial when an exception code refers to the internal process code Replenishment.

Direct replenishment is only possible in fixed storage bin scenarios. The system calculates the replenishment in accordance with the maximum and minimum quantity. It assumes that the quantity at the storage bin is zero.

The system rounds down the replenishment quantity to a multiple of the minimum replenishment quantity, if such a quantity is maintained.

Direct replenishment can be performed by the warehouse picker (picker-directed replenishment). In this case, a warehouse task for the replenishment displays as the next item to be processed in the picker's warehouse order. As a prerequisite, the system must have found stock in the permitted storage types. Picker-directed replenishment is only possible in radio frequency scenarios.

LESSON SUMMARY

You should now be able to:

- Perform ad hoc movements and replenishment

Unit 9

Learning Assessment

1. Using the `/SCWM/POST` transaction, you can create either a direct posting change or a posting change via a warehouse request document.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

2. The main difference between the planned and the automatic replenishment method is that the automatic method is executed during task confirmation.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

Unit 9

Learning Assessment - Answers

1. Using the `/SCWM/POST` transaction, you can create either a direct posting change or a posting change via a warehouse request document.

   Determine whether this statement is true or false.

   ☒ True

   ☐ False

   That's correct. You can create either a direct posting change or a posting change via a warehouse request document using the `/SCWM/POST` transaction.

2. The main difference between the planned and the automatic replenishment method is that the automatic method is executed during task confirmation.

   Determine whether this statement is true or false.

   ☒ True

   ☐ False

   That's correct! The main difference between the planned and the automatic replenishment method is that the automatic method is executed during task confirmation.

UNIT 10 Physical Inventory

Lesson 1

Outlining the Physical Inventory Process 187

Lesson 2

Setting Up the Procedures for Physical Inventory 190

UNIT OBJECTIVES

- Outline the physical inventory process in EWM
- Set up the procedures for physical inventory

Unit 10
Lesson 1

Outlining the Physical Inventory Process

LESSON OVERVIEW

In this lesson, you learn about the basic EWM physical inventory process. This process includes the steps necessary to carry out a physical inventory in SAP EWM.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Outline the physical inventory process in EWM

EWM Physical Inventory Process

The physical inventory process involves counting the physical inventory of a warehouse, from the preparation, through the actual counting and the entering of count results, to the approval of those count results, and the updating of the inventory in both SAP EWM and SAP ERP.

A physical inventory may be required by financial accounting rules or tax regulations to ensure an accurate inventory value. It may also be required by management to count inventory quantities so products can be restocked or corrected.

You use the physical inventory functions in EWM to carry out a physical inventory of products for stock control and balance sheet purposes. You have the following options:

- **Storage-bin-specific physical inventory**This inventory is counted at the storage bin level, and, therefore, all the products and HUs in this storage bin are counted.
- **Product-specific physical inventory**This inventory is based solely on the products in one or more storage bins and/or HUs.

SAP EWM Physical Inventory Process

The SAP EWM physical inventory process is illustrated in the following figure:

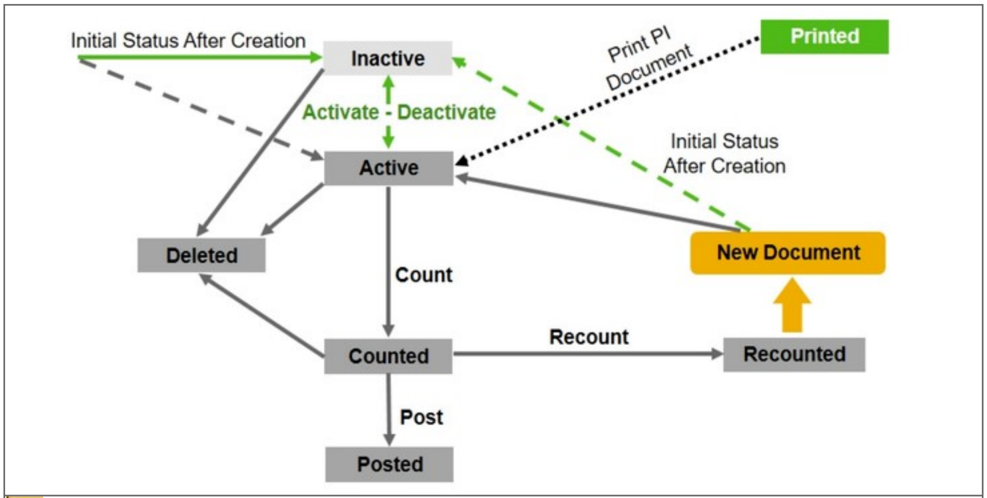


Figure 106: EWM Physical Inventory Process

During the SAP EWM physical inventory process, a physical inventory document is created that contains the bins/products to be counted. This document can be printed using the PPF function, or the physical inventory items can be counted using the RF framework.

If you have doubts about a count result, you can trigger a recount. In this case, the system creates a new PI document with reference to the original PI document.

After the count or recount process has been completed, the differences can be posted and the inventory completed.

Counting Using Mobile Devices

The use of mobile devices in the physical inventory process offers advantages. First of all, it is not necessary to block bins for the physical inventory. There is also much less chance of entering wrong counting results as can happen with paper-based counting. For bulk storage with handling units, you can carry out the physical inventory counting with **handling unit collective counting** This means that the total count results can be entered without verifying each HU number.

For the processing of physical inventory documents with mobile devices, you need to set up the determination of a queue which is relevant for RF-processing. Additionally, with a warehouse order creation rule specifically for physical inventory, you can control the size and the counting sequence of physical inventory documents.

It is also possible to create physical inventory documents ad-hoc with a mobile device, either for separate counting or for direct counting.

Paper-Based Counting

It is of course also possible to print out a counting document and to enter the results in EWM. There are different transactions available for the data entry, with SAP S/4HANA based EWM a SAP Fiori app is also available.

Physical Inventory Status

The status relationships present throughout the physical inventory progress are shown in the following figure:

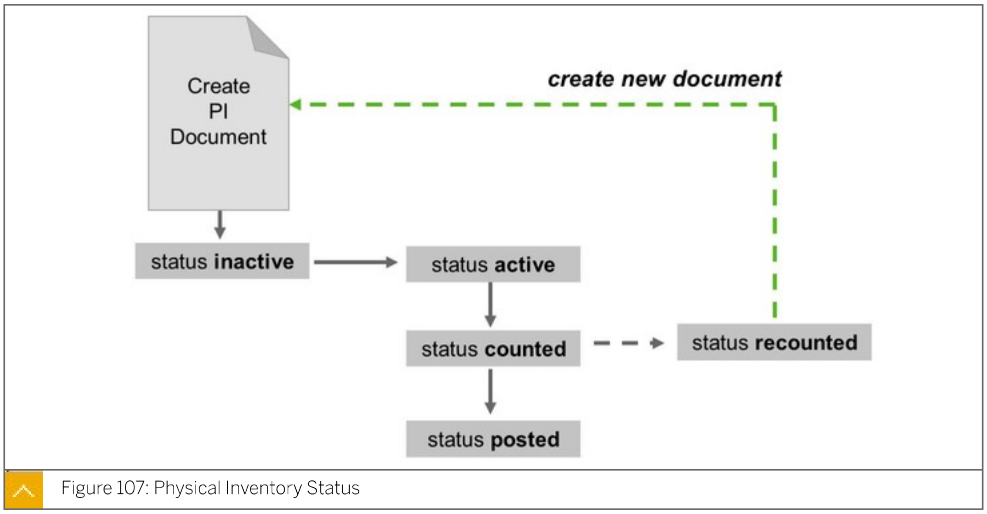


Figure 107: Physical Inventory Status

Physical inventory documents can be created with an inactive or an active status. The behavior is controlled by the reason for physical inventory that you select when you create the physical inventory document. If you do not select a reason, the standard reason that is assigned to the physical inventory procedure is used.

Completeness of Inventory

- An inventory of a **physical inventory area**is complete when you have counted all the relevant storage bins. A warehouse inventory is complete when you have carried out an inventory on all the relevant physical inventory areas.
- A **product** inventory is completed when you have counted all the stock of this product per physical inventory area and party entitled to dispose.

The completeness of a physical inventory area, or of the complete warehouse, remains intact. This means that if you have completely inventoried your warehouse in January, the beginning of the physical inventory year, it remains completely inventoried in December at the end of the physical inventory year.

LESSON SUMMARY

You should now be able to:

- Outline the physical inventory process in EWM

Unit 10
Lesson 2

Setting Up the Procedures for Physical Inventory

LESSON OVERVIEW

In this lesson, you learn the various physical inventory procedures supported in EWM.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Set up the procedures for physical inventory

Physical Inventory Procedures

EWM supports different types of inventory procedures as follows:

1. Periodic Physical Inventory (Storage-Bin Specific and Product Specific)
2. Continuous Physical Inventory Procedures
   - Ad-hoc Physical Inventory (Storage-Bin Specific and Product Specific)
   - Putaway Physical Inventory
   - Low Stock/Zero Stock Physical Inventory
   - Low Stock/Zero Stock Check
   - Storage Bin Check
3. Cycle Counting

Any or all of these procedures can be implemented in an EWM warehouse.

Periodic Physical Inventory Procedure

You can configure EWM to carry out an annual physical inventory (storage-bin-specific and product-specific) on a certain day or within a fairly short period (in most cases at the end of the fiscal year). During this time, you can prohibit stock movements. Furthermore, if you have set up a continuous inventory process, but no stock movements have occurred during the current fiscal year for some storage bins, you can use this procedure to carry out the physical inventory. The product-specific annual physical inventory corresponds to the storage bin-specific annual physical inventory (except that you carry it out for products).

Continuous Physical Inventory Procedure

The following are continuous physical inventory procedures:

- Ad Hoc Physical Inventory

Executed anytime during the fiscal year, an ad hoc physical inventory may become necessary, if, for example, a product has been damaged. This procedure can be performed at the storage bin level or it can be product-specific.

- Low Stock Physical Inventory

  This procedure is performed during warehouse task confirmation if the source bin contains only a small quantity (lower than a configurable threshold) after the stock removal. You can confirm in RF or on the printed warehouse order for the task that you have performed the physical inventory. During warehouse task confirmation, the system automatically creates the physical inventory document in the background based on information in the warehouse task. The low stock physical inventory is storage bin-specific.

- Zero Stock Physical Inventory

  This works in the same way as a low stock physical inventory with a threshold value of 0.

- Low Stock / Zero Stock Check

  A low stock / zero stock check is done during picking, similar to the low stock / zero stock physical inventor (and the same threshold value is used). The difference is that no physical inventory document is created.

- Putaway Physical Inventory

  This procedure is similar to the low stock physical inventory, but it occurs only during putaway. The putaway physical inventory for a storage bin is carried out at the time of the first putaway in this bin in the fiscal year. The warehouse employee confirms during the first putaway that the stock in the storage bin matches the confirmed quantity in the warehouse task after the putaway.

- Storage Bin Check

  The storage bin check is a procedure in which you check whether a product is actually stored in the storage bin in which it is supposed to be located. The quantity of the product in the storage bin is **not** counted, so it is not a physical inventory procedure in the true sense.

- Cycle Counting

  With cycle counting, you carry out a physical inventory of your stock at regular intervals during a fiscal year. Only a small subset is counted each day. Cycle counting is an ongoing inventory procedure and it is less disruptive (for daily business) compared to an annual inventory, where the whole warehouse is counted within a short time frame.

Cycle Counting and ABC Analysis

The following figure illustrates an example of how cycle counting could operate over a year:

For example:

class A:	total value 80% (of product costs), total amount 15%
class B:	total value 15%, total amount 35%
class C:	total value 5%, total amount 50%

ABC analysis:

With ABC analysis you can:

- differentiate between importance and unimportance
- avoid uneconomic effort

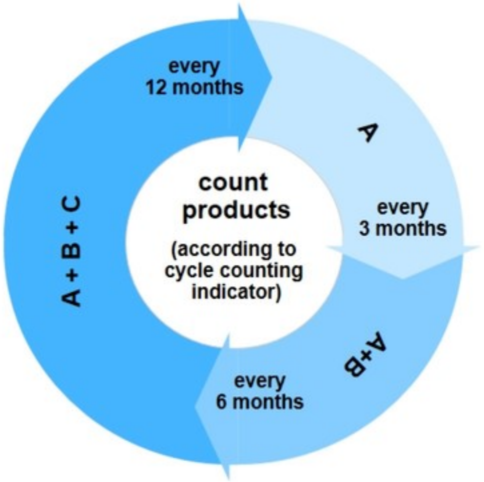


Figure 108: Cycle Counting Concepts

ABC analysisis a business term for an analysis procedure that divides objects into different classes (A, B C) with descending importance. For example, the most frequently ordered products are most important for revenue and would be classified as A items. The products with the lowest turnover would be classified as C items. The A-B-C classification code is the *Cycle Counting Indicator* code in EWM. In Customizing, you define the cycle counting indicator codes with an interval (in work days) after which a new physical inventory should be performed. For example, your fast movers (A items) could be counted every two months, and the very slow movers could be counted every 12 months (as required by financial accounting).

The cycle counting indicator is maintained in the warehouse product master data in the *Whse Data* view.

External Physical Inventory Procedures

In case of special requirements it is also possible to use external systems. You can upload and download storage bins and count data for counting in an external system. Details are described in the *Interfaces/Reports* section later in this lesson.

Physical Inventory Areas

For physical inventory, you create one or more physical inventory areas and assign the physical inventory area to an activity area in EWM. The activity area needs sort sequence for an activity which is connected to the *Warehouse Process Category* **Physical Inventory**.

> Note:
> This activity area is the only activity area in SAP EWM which is really required.

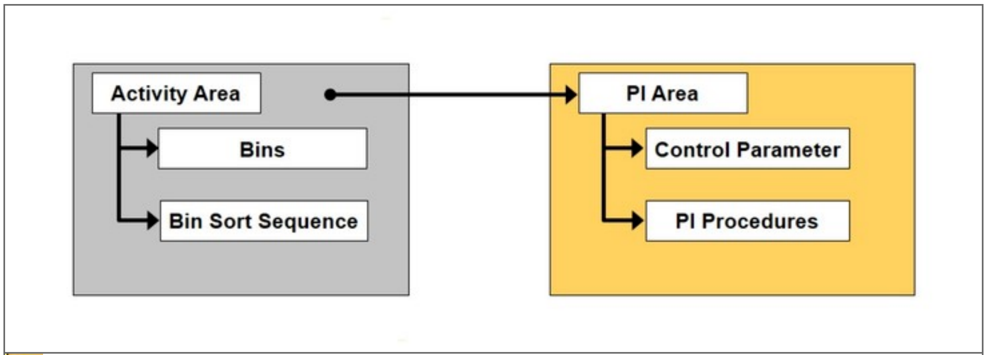


Figure 109: Physical Inventory Configuration

In the definition of the physical inventory area, you have the following options:

- Activate *Putaway Physical Inventory* and / or *Low Stock Check with Phys. Inventory* . If any of these two continuous inventory procedures is selected, you also need to enter the according type as *Permitted Document Types* .
- Activate *Low Stock Check Without Physical Inventory* . For this as well as for the *Low Stock Check with Phys. Inventory* the field *Qty (Physical-Inventory-Related Quantity Threshold Value)* controls the threshold.
- Select *Simultaneous Posting After Count Entry* to trigger an automatic posting if a difference is below the user related tolerance.
- The following indicators should only be set after checking with your auditor:
  - *Display Book Quantity at Time of Count Entry*: with this option it is possible to display the book inventory quantity when entering the count results in certain transactions.
  - *Proposed Inventory Quantity at Time of Count Entry* : Determines whether the inventory quantity is proposed at the time of count entry.
  - *Display Item Objects at Time of Count Entry*: Indicates that object information is to be displayed as suggested (default) lines when a count result is entered for a storage-bin-specific physical inventory. If you set this indicator, all objects at the storage bin will be suggested by the system for counting. Hierarchies of handling units (HUs) can thus be entered on a simplified basis.
  - *Printout of Item Objects in Phys. Inventory Count Document* : Indicates whether the object information is to be represented as suggested (default) lines when a physical inventory count document for a storage-bin-specific physical inventory is printed out.
  - *Serial Number in Phys. Inventory for Count (Suggest)* : Determines whether serial numbers are to be suggested by the system when count results are entered.
  - *"HU Complete" Allowed*: Indicates whether the possibility of counting a handling unit (HU) as "exists and complete" is allowed.
- *HU Counting Methods*: Specifies whether you want to count collectively the number of handling units (HUs) or the number of items inside a handling unit. This is specifically for bulk storage.
- *Completeness Check Online/Offline (Report)* : You use this indicator to determine whether the completeness check is to be carried out upon posting or in offline mode only (report).

- *No Default Stock Type* : You can specify a default stock type for your warehouse in the Customizing. If you select this checkbox, the system ignores the default stock type set on the warehouse level for your PI area.
- *Permitted Document Types*

  In this sub-dialog you have to enter all the different physical inventory procedures you plan to use in this physical inventory area.

Difference Analyzer

The *Difference Analyzer* is a tool in EWM that allows you to analyze the differences in EWM and reconcile stock in the ERP system, and, in particular, in financial accounting.

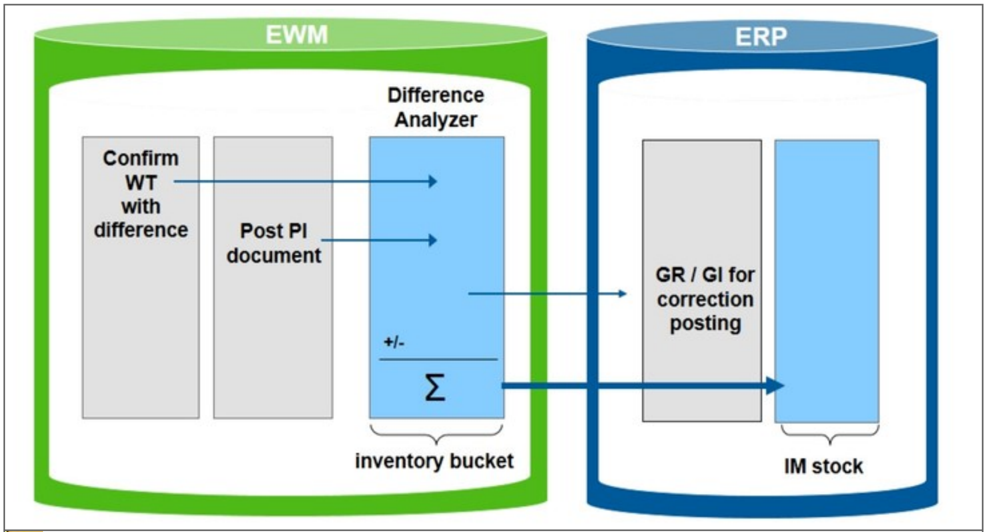


Figure 110: The Difference Analyzer

Using the Difference Analyzer, differences are displayed at both a cumulative and individual level. The individual differences are given a link to the document that has caused the difference. At a cumulative level, differences with the same stock key are displayed in an aggregated way. In other words, they are displayed independently of the document and process in which they occur. The objective of the cumulative display is to show the balance of the differences. This reduces the number of postings to the ERP system (where possible, to zero).

Post Differences to the ERP System

You can use this report to schedule the posting of differences to the ERP system as a background job. Like in the difference analyzer, you can post differences at a cumulative level and a item level. The system performs the tolerance check with the user settings for the user who starts the report. The EWM transaction code is as follows:

- *Post Differences to ERP System (/SCWM/WM_ADJUST)*

Interfaces/Reports

There are several transactions and reports available for special PI scenarios and for accompanying activities.

Physical Inventory with an external system

You can upload the storage bin data for which you want to carry out a physical inventory and carry out the physical inventory in EWM. Or you can carry out the physical inventory in an external system and then upload the results to EWM.

The following transaction codes can be used for uploading and downloading physical inventory related data:

- *Download Storage Bins and Count Data (/SCWM/PI_DOWNLOAD)*

  You can use this report to select physical inventory-relevant data within SAP EWM and download it to a file, so that it can be used by an external PI system. The program documentation for the transaction describes the details of the file which is produced.

- *Upload Storage Bins and Count Data (/SCWM/PI_UPLOAD)*

  With this report you upload data from a file coming from an external physical inventory (PI) system and use it to create PI documents within SAP EWM. This report can create PI documents which are then used for counting, or which already include counting values which are created in the external system.

For this you have to enable the physical inventory procedure *EL External Procedure (Storage-Bin Specific)* or *ES External Procedure (Product-Specific)* for the physical inventory area.

For **sample-based physical inventory**you download the storage bin and stock data. You then determine the sample in an external system and carry out the sample-based physical inventory in EWM. In the last step you download the counting results and send it to the external system for evaluation. This is also based on an **external** product-specific or bin-specific physical inventory procedure.

- *Download Stock Population (/SCWM/PI_SAMP_STOCK)*

  You use this report to download the stock population from the Extended Warehouse Management (EWM) system, so that it can be used by a third-party system for sample-based physical inventory. This is the first step of the sample-based physical inventory in the EWM system.

- *Upload Sample to Create PI Documents (/SCWM/PI_SAMP_CR)*

  You use this report to upload data from a file in order to create physical inventory documents in Extended Warehouse Management (EWM).

- *Download Results or Stock Population (/SCWM/PI_SAMP_UPDATE)*

  The report determines the physical Inventory counting results from the PI documents and determines the current stock population within the EWM system before downloading this data as a CSV data file to a PC or server, so that it can be used by a third party system.

Determine and Set prices from ERP

You use this report to download product prices from the ERP system in EWM. The system takes into account these prices during the tolerance checks when you post physical inventory documents in EWM and when you post differences to the ERP systems. The EWM transaction code is as follows:

- *Determine and set prices from ERP (/SCWM/VALUATION_SET)*

Note:
The prices uploaded to EWM are only used for controlling who is allowed to post certain differences (through the tolerance groups). The value for the posting in Financials is always the actual value in ERP.

Note:
This report is not required in SAP S/4HANA when using embedded EWM.

Stock Comparison with ERP

You can use this report to identify and correct inconsistencies between EWM and the ERP system. Because you perform inventory management for a specific storage bin in EWM, unlike in the ERP system, where you perform inventory management for a specific storage location, the system always assumes that the stock in EWM is correct. Therefore, the system also assumes that you have to correct the stock in the ERP system where necessary. The EWM transaction code is as follows:

- *Stock Comparison ERP (/SCWM/ERP_STOCKCHECK)*

Note:
This report is helpful, but in case of frequent stock differences it is important to find out the root cause for these and not just to permanently use this report for corrections. The report also does not show difference created through physical inventory (if you have posted the difference in EWM, but not yet in ERP), but only real inconsistencies.

Business Application Programming Interfaces (BAPIs)

The following business application programming interfaces (BAPIs) can be used:

- `/SCWM/BAPI_PI_DOCUMENT_CREATE`
- `/SCWM/BAPI_PI_DOCUMENT_DELETE`
- `/SCWM/BAPI_PI_DOCUMENT_COUNT`
- `/SCWM/BAPI_PI_DOCUMENT_POST`

LESSON SUMMARY

You should now be able to:

- Set up the procedures for physical inventory

Unit 10

Learning Assessment

1. You can use physical inventory functions in EWM to carry out a physical inventory of products and handling units (HUs) for stock control and balance sheet purposes. Which of the following are physical inventory functions in EWM?

   Choose the correct answers.

   ☐ A Storage bin-specific physical inventory

   ☐ B HU-specific physical inventory

   ☐ C Storage type-specific physical inventory

   ☐ D Product-specific physical inventory

2. Match the following transaction codes with their function.

   Match the item in the first column to the corresponding item in the second column.

`/SCWM/ERP_STOCKCHECK`
`/SCWM/VALUATION_SET`
`/SCWM/WM_ADJUST`
`/SCWM/PI_DOWNLOAD`

Stock comparison with ERP
Post differences to ERP System
Determine and set prices from ERP
Download storage bins and count data

Unit 10

Learning Assessment - Answers

1. You can use physical inventory functions in EWM to carry out a physical inventory of products and handling units (HUs) for stock control and balance sheet purposes. Which of the following are physical inventory functions in EWM?

   Choose the correct answers.

   ☒ A Storage bin-specific physical inventory

   ☐ B HU-specific physical inventory

   ☐ C Storage type-specific physical inventory

   ☒ D Product-specific physical inventory

   That's correct! Storage bin-specific physical inventory and product-specific physical inventory are physical inventory functions in EWM.

2. Match the following transaction codes with their function.

   Match the item in the first column to the corresponding item in the second column.

`/SCWM/ERP_STOCKCHECK`
`/SCWM/VALUATION_SET`
`/SCWM/WM_ADJUST`
`/SCWM/PI_DOWNLOAD`

Stock comparison with ERP
Determine and set prices from ERP
Post differences to ERP System
Download storage bins and count data

That's correct! The transaction code for stock comparison with ERP is `/SCWM/ERP_STOCKCHECK`; the transaction code to determine and set prices from ERP is `/SCWM/VALUATION_SET`; the transaction code for posting differences to ERP system is `/SCWM/WM_ADJUST`; and the transaction code to download storage bins and count data is `/SCWM/PI_DOWNLOAD`.

UNIT 11 Slotting

Lesson 1

Configuring the Slotting Process 200

UNIT OBJECTIVES

- Configure the slotting process

Unit 11
Lesson 1

Configuring the Slotting Process

LESSON OVERVIEW

Slotting and rearrangement are key functions in Extended Warehouse Management. In this lesson the key concepts and functions provided by the slotting processes in SAP EWM are presented.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Configure the slotting process

Slotting

Slotting is the process of determining a storage concept for a product by setting the storage parameters that control (mostly) the putaway of the product. The slotting process can use a variety of data to determine the putaway control parameters, such as the following:

- Product data, which is not warehouse specific
- Packaging data
- Demand forecasts

> Note:
>
> Slotting is generally an optional process. But there is a customizing setting which requires that the slotting process has to been done for a product, otherwise putaway can not be done.
>
> The setting is found under: *SCM Extended Warehouse Management* → *Extended Warehouse Management* → *Goods Receipt Process* → *Strategies* → *Define Warehouse Number Parameters for Putaway* . If the flag *No BinDet. w/o Slot.* is set for your warehouse, products without a slotting status will not be putaway.

Storage Parameters

During slotting, the system determines control parameters and stores them in the product master.

The main parameters are as follows:

Putaway control indicator (and, optionally, stock removal control indicator)
Storage section indicator
Storage bin types

All these parameters a determined using the condition technique. The storage bin types can also be determined with storage bin type determination rules.

Besides the described parameters, the system can also determine maximum, minimum, and minimum replenishment quantities (all for the replenishment process), and assign fixed bins.

Use of Storage Bin Type Determination Rules

There are two options for determining the optimum storage bin type in slotting:

- Using the condition technique (in the same way as determining the putaway control indicator and the storage section indicator)
- Using storage bin type determination rules

The option that the system uses depends on the parameters that you have defined at storage type level for slotting.

When using condition technique, and using information like weight, volume or dimensions of your product, you probably additionally require **indicators** which are determined during the slotting process.

Example: you want to use the height of the product to determine a bin type. What you can not enter in a condition record is something "up to" or "smaller then". For this scenario the steps are:

- You first define dimension indicators for the different height levels you want to consider (for example: "1m" and "2m")
- You assign intervals to these indicators (for a maximum height of 1m the indicator "1m" is assigned, for a maximum height of 2m the indicator "2m" is assigned)
- You define condition records where you use the indicator for the bin type determination.

During slotting the system first determines the indicator, then the indicator is used for the condition record.

The following storage bin type determination **rules** are available:

- Maximum Weight
- Capacity Factor: Material
- Simple Volume Check
- Simple Dimension Check
- Dimension Check with Z-Axis Rotation
- Dimension Check with Rotation and Tilt
- Weight Check and Simple Volume Check
- Weight Check and Simple Dimension Check
- Weight Check and Dimension Check with Z-Axis Rotation
- Weight Check and Dimension Check with Rotation and Tilt

For using storage bin type determination rules it is necessary to maintain the relevant data (like dimensions) in the bin type.

Slotting Process

You can execute slotting in the foreground or schedule it as a regular background job.

The requirement/demand data can come from SAP Advanced Planning and Optimization (APO). SAP EWM stores this information locally in the product master on the *Slotting* tab, in the *Requirement/Demand Data* screen area. You can also define these local attributes in EWM using data from other sources. To do this, you have several processing options in the product master, for example, manual input or mass maintenance.

One consideration when using APO planning data is that the integration of SAP APO and SAP EWM is part of the Service Parts Management (SPM) solution. SAP APO and SAP EWM manage requirement data at different organizational levels. SAP APO performs planning processes for locations of the *Plant* type. SAP EWM stores requirement data at the warehouse number level. Slotting assumes that a 1:1 relationship exists between the APO location and the EWM warehouse number. If the relationship is not 1:1, you can use Business Add-Ins (BAdIs) for the conversion.

An overview of the slotting process is illustrated in the following figure:

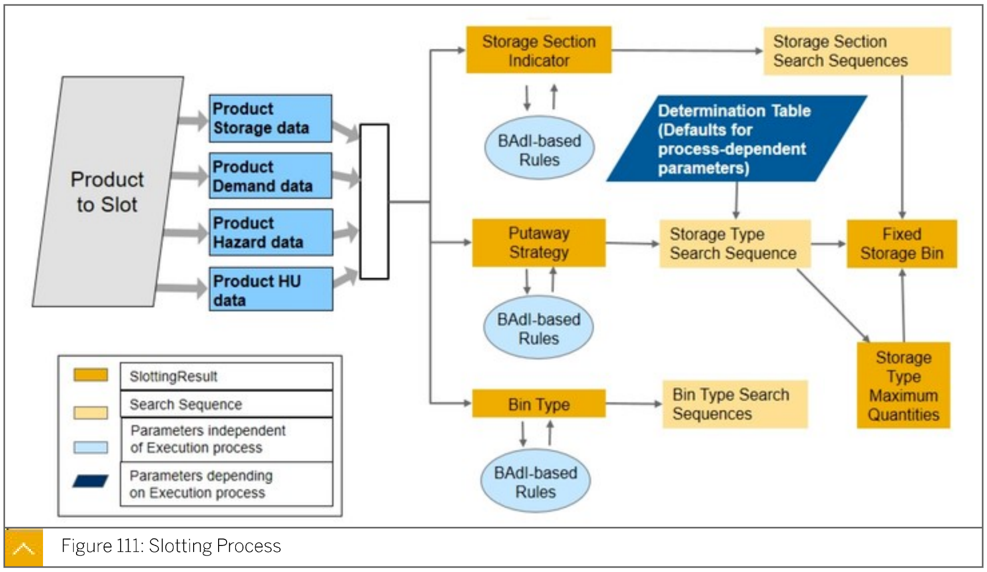

Product to Slot
Product Storage data
Product Demand data
Product Hazard data
Product HU data
Storage Section Indicator
Storage Section Search Sequences
BAdI-based Rules
Determination Table (Defaults for process-dependent parameters)
Putaway Strategy
Storage Type Search Sequence
Fixed Storage Bin
BAdI-based Rules
Storage Type Maximum Quantities
Bin Type
Bin Type Search Sequences
BAdI-based Rules
SlottingResult
Search Sequence
Parameters independent of Execution process
Parameters depending on Execution process

Figure 111: Slotting Process

During slotting, the determination data is obtained from the system. Then, using the condition technique as the primary driver, the indicators are determined and can be stored in the warehouse product master. All the product attributes that form the slotting results exist twice in the product master as **active values**and **planned values**

Save Options

The exact values that are updated when the results are updated depend on the save mode that you chose when you activate slotting. The save options are as follows:

- Do Not Save Results

  Use this option if you have performed slotting interactively and you want to analyze the results. If you have performed slotting in the background, you can analyze the log, but you cannot see the results directly.

- Save Results

  Depending on the storage bin and stock situations, it can be useful to save the results of slotting as **planned values only**in the product master. The system only keeps the planned values for a possible activation, and does not use them in storage processes.

- Save and Activate Results

  The system updates the result of slotting in the fields for **both the planned values and the active values** in the product master. These new values are then available immediately for all storage processes.

You can use the **fix** indicator in the warehouse product to fix all product attributes that can form the results of slotting. In this case, the system does not overwrite these attributes during slotting.

Condition Technique in Slotting

During slotting, the system can determine the following storage parameters using the condition technique:

- Putaway control indicator (and, optionally, stock removal control indicator): used to determine the storage type search sequence
- Storage section indicator: used to determine the storage section during putaway warehouse task creation
- Storage bin types

You can find the condition technique configuration related to slotting in Customizing in *Extended Warehouse Management → Goods Receipt Process → Slotting → Condition Technique*. The basic structure of the condition technique used in slotting is illustrated in the following figure:

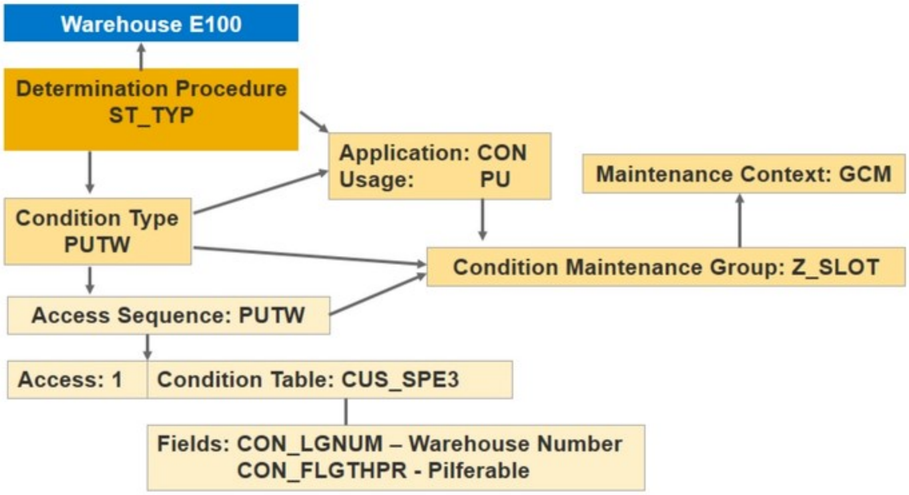


Figure 112: Example of Condition Technique in Slotting

This example illustrates the determination of the putaway control indicator based on the *Pilferable* indicator setting in the warehouse product master (in the *Storage* view). Depending on the pilferable flag, the system assigns a putaway control indicator in accordance with your condition record.

The putaway control indicator is located in the warehouse product master in the *Whse Data* view, and is used in the storage type determination process.

Condition Technique Configuration

To configure the condition technique to determine the putaway control indicator:

1. Create a *Condition Table* that contains the fields used to determine the putaway control indicator. In our example the fields are *CON_LGNUM* and *CON_FLGTHPR*.
2. Assign the *Condition Table* to an *Access Sequence*. **`PUTW`** is the access sequence in the example.

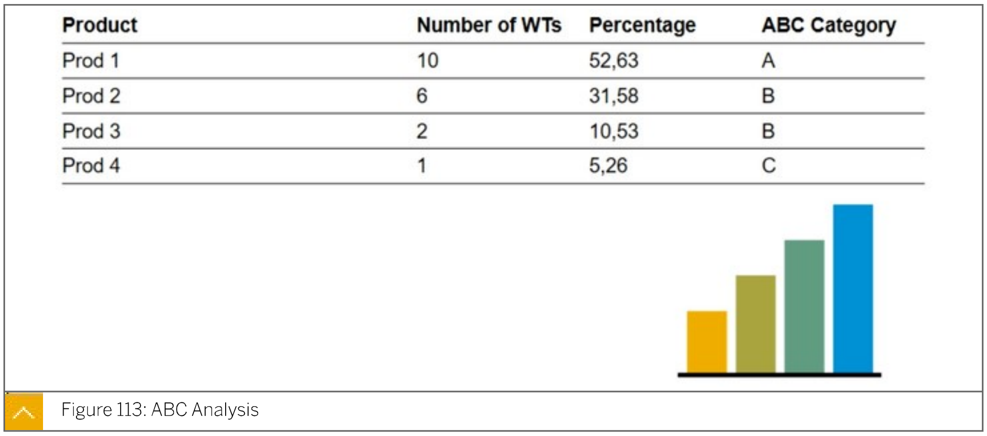
   In the assignment you can set for fields from the condition table the *Access Type* **`Field in free key part`**. This is important if you want to use several condition fields in different combinations. This way you can combine them in one condition table instead having several and have to use a sequence. It is also important for a field like *CON_FLGTHPR*, which is either set or blank.
3. The *Access Sequence* is assigned to a *Condition Type*. The condition type has an assignment to an an *Application* (**`CON`**) and a *Usage* (**`PU`**). These two fields and their values are pre-created by SAP and indicate to the system how the condition types and the determination procedures to which they are assigned will be used by the system.
4. The **`PUTW`** condition type is part of the *Condition Determination Procedure* **`ST_TYP`**. The determination procedure is assigned to the specific use in the warehouse.
5. You create a *Condition Maintenance Group* and assign the *Application*, *Usage*, *Condition Table*, and *Condition Type*. The condition maintenance group is used to create the required screens for the condition record maintence.
6. The condition maintenance group is then assigned to a *Maintenance Context*. There is one pre-created SAP condition maintenance context for all of the applications of the condition technique in EWM. It is called **`GCM`**.
7. Once you have configured the condition technique, the final step is to set up the condition records in the master data used in the determination process. These are created using the *EWM Easy Access* menu in *Extended Warehouse Management* → *Master Data* → *Slotting* → *Condition Maintenance for Slotting*. (Transaction code `/SCWM/GCMC`).

ABC Analysis

A complementary function to slotting is the *ABC Analysis*. This feature is available since S/4HANA 1809 for embedded EWM and also for the decentralized EWM based on S/4HANA. For decentralized EWM 9.5 it is available with SP05 (see SAP Note 2809838 for details).

The ABC Analysis allows you to categorize the importance of products based on confirmed warehouse tasks (either the number of warehouse tasks or the quantity of the product in the warehouse tasks). It can not set all the storage parameters which can be set through slotting, but therefore it does not require the use of condition technique and the creation of condition records. The following indicators can be updated using the ABC Analysis:

- Putaway Control Indicator
- Storage section indicator, either on warehouse level or for specific storage types
- Cycle counting indicator



Product	Number of WTs	Percentage	ABC Category
Prod 1	10	52,63	A
Prod 2	6	31,58	B
Prod 3	2	10,53	B
Prod 4	1	5,26	C

Figure 113: ABC Analysis

Example for ABC Analysis

You have a warehouse product group consisting of five products. You want to categorize the products based on their picking volume, that is, the number of pick warehouse tasks. The ABC analysis groups the products into categories. Each category will have a different strategy for putaway to store them according to their picking frequency. The groups descend from most important to least important.

ABC analysis for picking classifies the products into the following categories:

Catagory	Meaning
A	Products that are picked most frequently or have the highest contribution to business success
B	Products that are picked in a medium frequency or have a moderate contribution to business success
C	Products that are picked least frequently or have low contribution to business success

You set the ABC categories and desired putaway behavior in the following way:

Category	Percentage of Pick Warehouse Tasks	New Storage Section Indicator
A	80%	Fast
B	15%	Medium
C	5%	Slow

The raw data of your ABC analysis is as follows:

Product	Number Pick Warehouse Tasks
PROD1	10
PROD2	6

Product	Number Pick Warehouse Tasks
PROD3	2
PROD4	1
PROD5	0

When the categorization is applied to the raw data, it leads to the following intermediate calculations:

Product	Number Pick Warehouse Tasks	Percentage of Warehouse Tasks
PROD1	10	52,63 %
PROD2	6	31,58 %
PROD3	2	10,53 %
PROD4	1	5,26 %
PROD5	0	0 %

The ABC analysis sorts the products by the proportion or percentages of all pick warehouse tasks and sorts them from highest to lowest. After sorting, the ABC analysis applies the specified limits of each category, as follows:

Product	Number Pick Warehouse Tasks	Percentage of Warehouse Tasks	ABC Category
PROD1	10	52,63 %	A
PROD2	6	31,58 %	B
PROD3	2	10,53 %	B
PROD4	1	5,26 %	C
PROD5	0	0 %	C

- The percentage of PROD1 is less than 80%, so it is put into category A.
- Adding the percentage of PROD2 already exceeds the limit of 80%, so PROD2 is put into category B.
- Adding the percentage of PROD3 does not yet reach 95%, so PROD3 is put into category B.
- Adding the percentage of PROD4 leads to more than 95%, so PROD4 is put into category C.
- The last product PROD5 is put into category C since 95% of picking volume was already surpassed.

The system assigns the storage section indicator for putaway behavior, as follows:

Product	Number Pick Warehouse Tasks	Percentage of Warehouse Tasks	ABC Category	New Storage Section Indicator
PROD1	10	52,63 %	A	Fast
PROD2	6	31,58 %	B	Medium
PROD3	2	10,53 %	B	Medium
PROD4	1	5,26 %	C	Slow
PROD5	0	0 %	C	Slow

LESSON SUMMARY

You should now be able to:

- Configure the slotting process

Unit 11

Learning Assessment

1. During slotting, the system can determine the following storage parameters using the condition technique: putaway control indicator, storage section indicator, and storage bin types.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

Unit 11

Learning Assessment - Answers

1. During slotting, the system can determine the following storage parameters using the condition technique: putaway control indicator, storage section indicator, and storage bin types.

   Determine whether this statement is true or false.

   ☒ True

   ☐ False

   That's correct! During slotting, the system can determine the putaway control indicator, storage section indicator, and storage bin type parameters.

UNIT 12

Post Processing Framework (PPF)

Lesson 1

Outlining the PPF 211

Lesson 2

Applying the PPF in Delivery Processing 214

UNIT OBJECTIVES

- Outline the PPF
- Apply the PPF in delivery processing

Unit 12
Lesson 1

Outlining the PPF

LESSON OVERVIEW

The Post Processing Framework (PPF) provides SAP applications with a uniform interface for the condition-dependent generation of actions (for example, printing delivery notes, faxing, creating subsequent documents, and triggering workflow processes). In this lesson the fundamental concepts, terminology, and functions of PPF are outlined.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Outline the PPF

PPF

The Post Processing Framework (PPF) provides tools for scheduling, starting, and monitoring actions. Determination, generation, and processing of actions can either be done automatically or with user interaction.

The PPF is part of the SAP Web Application Server and can be used by different applications. It is the successor to Message Control and offers a wider functional scope, more simple connection to the applications, and greater flexibility.

PPF Functions

The following graphic illustrates the functions of the PPF:

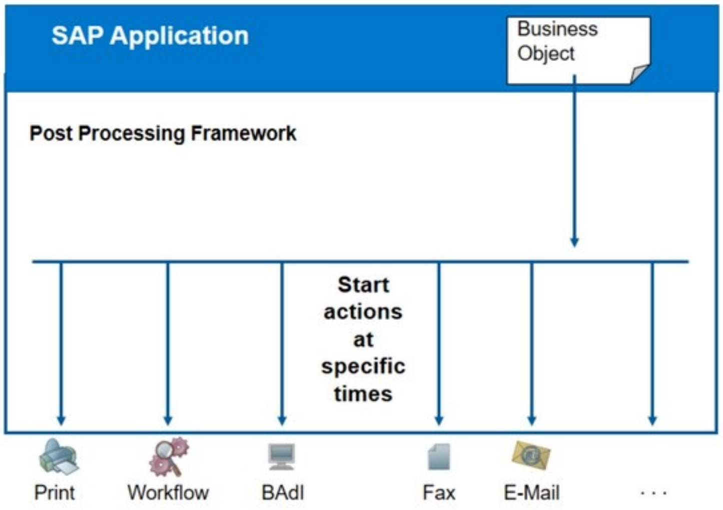


Figure 114: PPF Functions

The PPF provides processing types that take over the execution of various actions, such as the following:

- Printing, sending e-mails, and faxing with smart forms
- Starting a workflow
- Starting a Business Add-In

The processing types can be adopted by the application, adapted to meet the requirements of the application, or replaced with the application's own processing types. The PPF also provides tools for the administration of actions, and an action overview with status display, determination logs, and processing logs. The overview can be included in the application as a subscreen.

Structure of PPF

The PPF is made up the following parts:

- Action Profile: contains action definitions and the settings for all the action definitions in the profile. Common profiles contain reusable actions, such as sending e-mail.
- Action Definition: describes the content of an action independently of the processing type. However, the types with which the actions can be processed, as well as the partners with which the actions can be executed, are assigned to the action definition.
- Action Determination: checks whether the conditions for scheduling the actions have occurred using the attributes of the application documents that are available using the business object assigned in customizing. The technology used for the determination is specified for each action definition. The standard determination uses workflow rules.
- Action Merging: merges new actions with any actions in the action list or worklist that have not yet been executed, according to specific criteria.
- Action List: lists actions that have been scheduled by the determination process for an application document. Users can display the action list and if necessary edit it.
- Worklist: contains actions that can be scheduled manually.
- Processing (Type): executes a particular action (for example printing, sending, or starting a workflow) at runtime.

PPF Connections

The following figure illustrates the connections in the PPF:

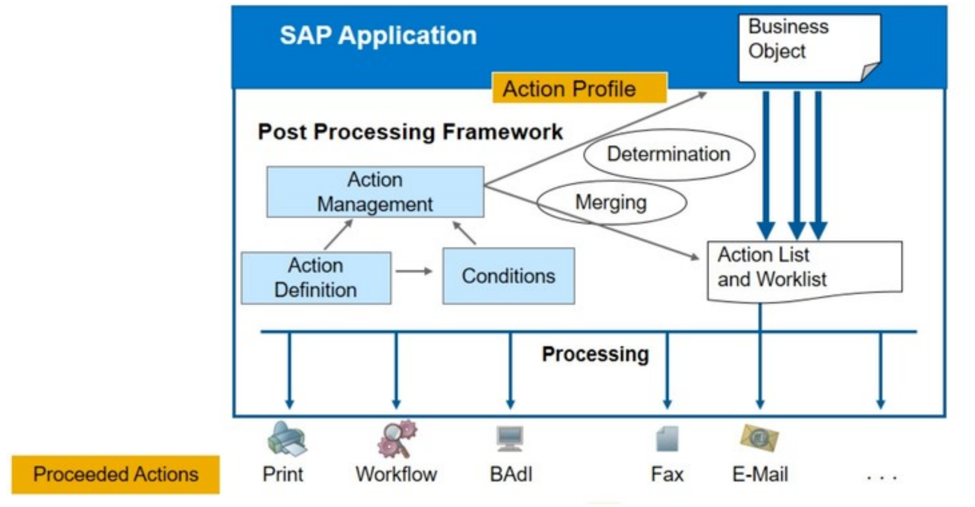


Figure 115: PPF Connections

The executed actions are permanently linked with the application document and they are also deleted with it.

LESSON SUMMARY

You should now be able to:

- Outline the PPF

Unit 12
Lesson 2

Applying the PPF in Delivery Processing

LESSON OVERVIEW

The Post Processing Framework (PPF) is a Basis technology used in EWM delivery processing for scheduling and processing actions with reference to delivery documents. Output/ message control for EWM delivery processing uses the PPF. In this lesson we will review how PPF is used in delivery processing.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Apply the PPF in delivery processing

PPF in Delivery Processing

The Post Processing Framework (PPF) provides basic functions that are delivered with predefined settings depending on the application. You can adjust the settings as you require.

The PPF provides the following functions:

- Technique for determining actions
- Technique for grouping found actions
- Framework for processing actions, such as a printer, fax, or e-mail
- User interface for customizing action templates such as determination and aggregation techniques as well as processing mediums
- User interface for the customizing conditions if you use determination by conditions

PPF Configuration Steps

In customizing for delivery processing, you execute the following activities:

- Create an action profile.
- Under the action profile, you define actions, for example sending messages, printing delivery notes, or posting goods receipt. For every action, you define a processing type, action determination, and processing time-spots.
- If necessary, define conditions for the actions in the profile.
- Assign the action profile to the document type and item type.

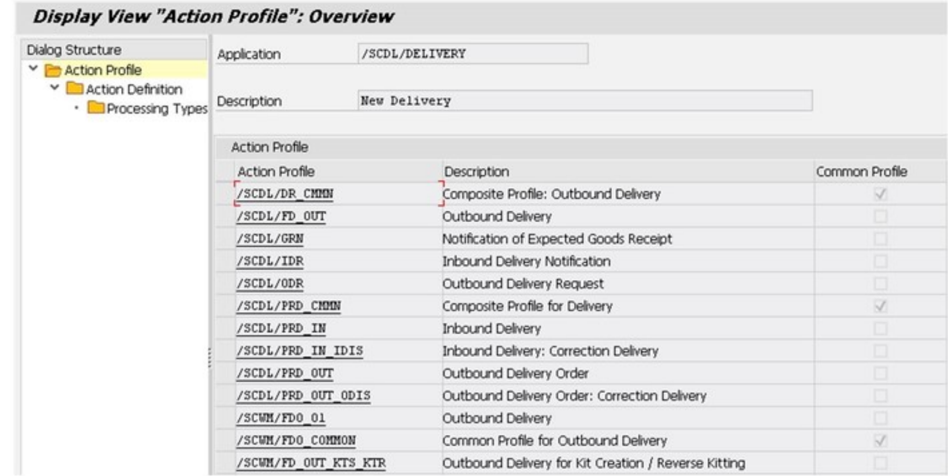
Action Profile Definition

The action profile contains action definitions and the settings for all the action definitions in the profile. The actions are saved in an action profile and the action profile is linked to the document type.

The action profile defines the set of allowed actions for a document type. You also use the action profile to define general conditions for the actions it contains, for example:

- The time when the system starts the action (such as when saving a document)
- The processing type used to execution the action

To configure this, in Customizing for *SCM Extended Warehouse Management*, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Delivery Processing* → *Actions* → *Change Actions and Conditions* → *Define Action Profiles and Actions*.



Display View "Action Profile": Overview

Application: /SCDL/DELIVERY

Description: New Delivery

Action Profile

Action Profile	Description	Common Profile
/SCDL/DR_CMMN	Composite Profile: Outbound Delivery	☑
/SCDL/FD_OUT	Outbound Delivery	☐
/SCDL/GRN	Notification of Expected Goods Receipt	☐
/SCDL/IDR	Inbound Delivery Notification	☐
/SCDL/ODR	Outbound Delivery Request	☐
/SCDL/PRD_CMMN	Composite Profile for Delivery	☑
/SCDL/PRD_IN	Inbound Delivery	☐
/SCDL/PRD_IN_IDIS	Inbound Delivery: Correction Delivery	☐
/SCDL/PRD_OUT	Outbound Delivery Order	☐
/SCDL/PRD_OUT_ODIS	Outbound Delivery Order: Correction Delivery	☐
/SCWM/FDO_01	Outbound Delivery	☐
/SCWM/FDO_COMMON	Common Profile for Outbound Delivery	☑
/SCWM/FD_OUT_KTS_KTR	Outbound Delivery for Kit Creation / Reverse Kitting	☐

Figure 116: Action Profile Definition

When creating an action profile, consider to which document type you need to assign the action profile.

SAP provides various standard predefined action profiles with corresponding standard actions for the standard processes in delivery processing.

Create a New Action Profile

To create a new action profile, maintain or enter the following data in the *Action Profile* screen:

- Name (*Action Profile*) and *Description* for the action profile
- *Category of Object Type:* **`Persistent Class`**
- *Object Type Name:* **`/SCDL/CL_DLV_PPF`** - **`PPF: Connecting Delivery to Processing to PPF`**

> Note:
> The *Persistent Class* represents the business object. The assignment to the object type ensures that the attributes of the persistent class are used to define and process the conditions.

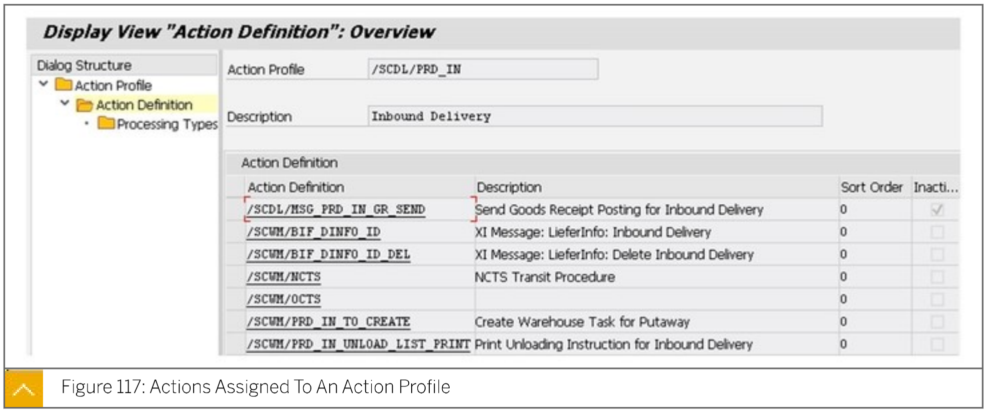
- *Context Class*: **`/SCDL/CL_DLV_CONTEXT_PPF - PPF: Context Class for Delivery Processing`**

Action Definition

An action is a function or a process that is applied to an application document based on specific conditions. You can execute it immediately or schedule it to run later. You can configure actions both at the header level or at the item level of the document. They can be performed in the background by the system, by a person, or by a group/organizational unit.

Examples of actions include:

- Activate inbound delivery notification
- Post goods receipt
- Print delivery note



Action Profile /SCDL/PRD_IN

Description Inbound Delivery

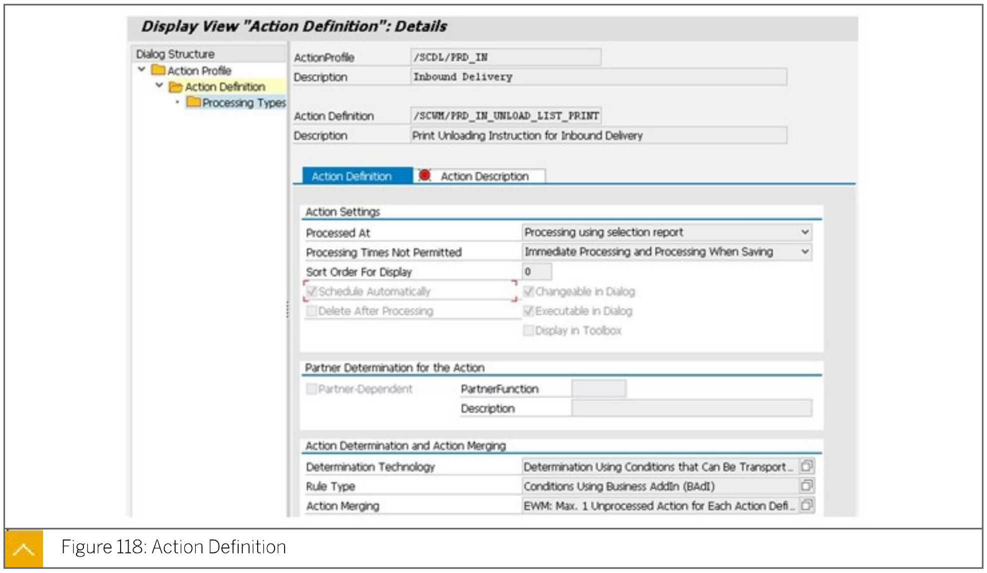
Action Definition

Action Definition	Description	Sort Order	Inacti...
/SCDL/MSG_PRD_IN_GR_SEND	Send Goods Receipt Posting for Inbound Delivery	0	☑
/SCWM/BIF_DINFO_ID	XI Message: LieferInfo: Inbound Delivery	0	☐
/SCWM/BIF_DINFO_ID_DEL	XI Message: LieferInfo: Delete Inbound Delivery	0	☐
/SCWM/NCTS	NCTS Transit Procedure	0	☐
/SCWM/OCTS		0	☐
/SCWM/PRD_IN_TO_CREATE	Create Warehouse Task for Putaway	0	☐
/SCWM/PRD_IN_UNLOAD_LIST_PRINT	Print Unloading Instruction for Inbound Delivery	0	☐

Figure 117: Actions Assigned To An Action Profile

Action Definition

The figure shows the Action Definition: Details screen.



ActionProfile /SCDL/PRD_IN

Description Inbound Delivery

Action Definition /SCWM/PRD_IN_UNLOAD_LIST_PRINT

Description Print Unloading Instruction for Inbound Delivery

Action Settings

Processed At: Processing using selection report

Processing Times Not Permitted: Immediate Processing and Processing When Saving

Sort Order For Display: 0

☑ Schedule Automatically ☑ Changeable in Dialog

☐ Delete After Processing ☑ Executable in Dialog

☐ Display in Toolbox

Partner Determination for the Action

☐ Partner-Dependent PartnerFunction

Description

Action Determination and Action Merging

Determination Technology: Determination Using Conditions that Can Be Transport...

Rule Type: Conditions Using Business AddIn (BAdI)

Action Merging: EWM: Max. 1 Unprocessed Action for Each Action Defi...

Figure 118: Action Definition

Defining Actions

You define actions under an *Action Profile* . To create a new action, maintain the following fields in the *Action Definition* screen:

- *Name* and *Description* for the action
- *Processed At* - You can set up the action to be processed after document posting. You can also set it to be scheduled. Processing can then be started later at a specific time, under specific conditions, or manually by a user. The process selections are described in detail in the following table:

Table 9: Process Times

Title	Description	Example	Started by
Processing using selection report	A selection report selects the actions to be processed and starts processing them after the report selection.	All faxes are to be sent at night in a background run.	Scheduled job (automatic)
Immediate processing	The actions start as soon as they are created or selected from the worklist.	Generate credit memo item.	Application program (implicitly the PPF)
Processing when saving document	Actions are processed immediately after document posting, that is, immediately before a COMMIT WORK.	After posting an order, an order confirmation is sent immediately by mail.	Application program (implicitly the PPF)

- You set the *Partner-Dependent* field to trigger an action for a specific partner function, for example, to send a reminder e-mail to all the employees responsible for the document. You also define a partner function or partner function category for which the action applies. You can also define the action customer-dependent with conditions

  You can also define the action customer-dependent with conditions.

- **Determination Technology**- Determination generates proposals for actions when specific conditions occur. This can take place automatically or manually. The technology for evaluating conditions can be adapted to meet the requirements of the relevant applications.

  Select “Determination using Transportable Conditions” (default). Determination is called automatically when the application document is saved after relevant changes. It uses the attributes of a business object to check whether the conditions for scheduling actions apply. The actions found are inserted into the action list according to the merging rule.

- **Rule Category**- Determination using conditions can be implemented using:
  - Workflow condition editor

  - Business Add-In: **`EVAL_SCHEDCOND_PPF`** (default)

- Action Merging- Here you define the number of processed and unprocessed actions. Action merging is always necessary if existing, unprocessed actions are merged with newly found actions. This is the case if an existing document is changed, for example. Since the data has changed, actions that were found when creating the document can be omitted.

  The PPF provides several merge technologies that permit only one unprocessed action for each action definition or processing type. The technologies cover the following situations:

  - An action has been found and is not yet in the action list. It is inserted into the action list.
  - An action has not been found but is in the action list. It is deleted from the action list and also from the database, if not changed manually.
  - An action has been found but is already in the action list. If the existing action has not already been changed manually, the new action replaces the existing action.
  - An action is executed a configurable maximum number of times. Any further actions found will not be executed.
  - The PPF also provides a merge technology that permits only one unprocessed action per partner.

Process Type Definition

A scheduled action is initially only a management record. Processing the action generates an output format, such as print, fax, or workflow. The application data is transferred to the processing program.

For example, in the “call” action, information like customer, contract, and responsible sales employee is transferred to the workflow and the workflow is started, which places the “call” work item in the inbox of the sales employee.

The PPF provides a number of process types. The following are currently supported using Smart Forms:

- Print
- Fax
- Mail

The following technologies can also be used as processing types:

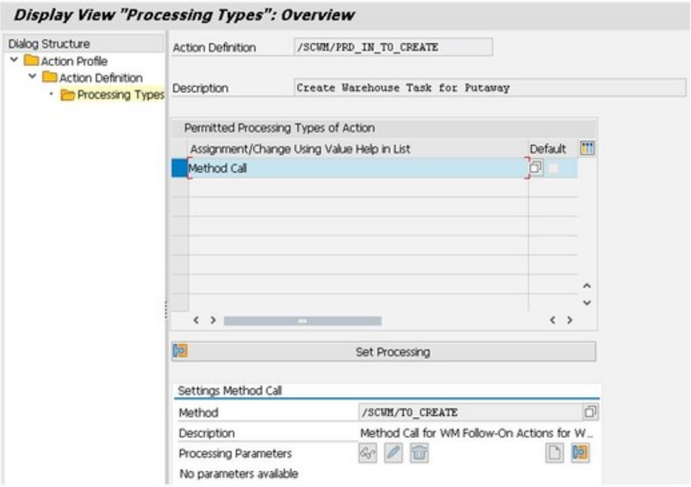
- BAdI
- Workflow
- External communication (print, fax, mail)

Configuring Actions

To define the technology for performing the action, in the *Processing Types* screen, do the following:

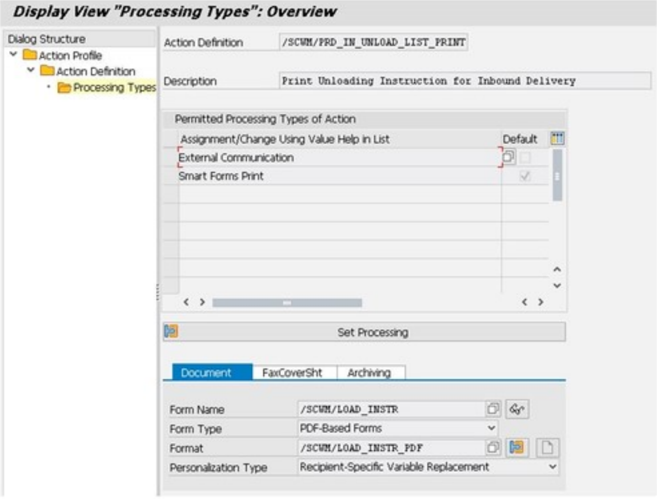
- Select the appropriate processing type (**`Workflow`**, **`Method call`**, or **`Smart Forms`**). You can select several processing types, with one as the default.
- In *Processing Type* details, do the following:

- For processing with method call - Choose a method (**`BAdI`**) in the *Filter Value* field. You can display the source text for the selected method by clicking the *Display Implementation* icon. Define the processing parameters (container) and enter the default values (for example, import, document type, export: external document number) in the BAdI implementation definition.
- For workflow processing - choose a workflow template
- For processing using smart forms - choose **`Print`**, **`Fax`**, or **`E-mail`** as the output, and enter a form name, a processing class, and a processing method.



Action Definition: /SCWM/PRD_IN_TO_CREATE
Description: Create Warehouse Task for Putaway
Method Call
Method: /SCWM/TO_CREATE
Description: Method Call for WM Follow-On Actions for W...
No parameters available

Figure 119: Processing Type - Method Call

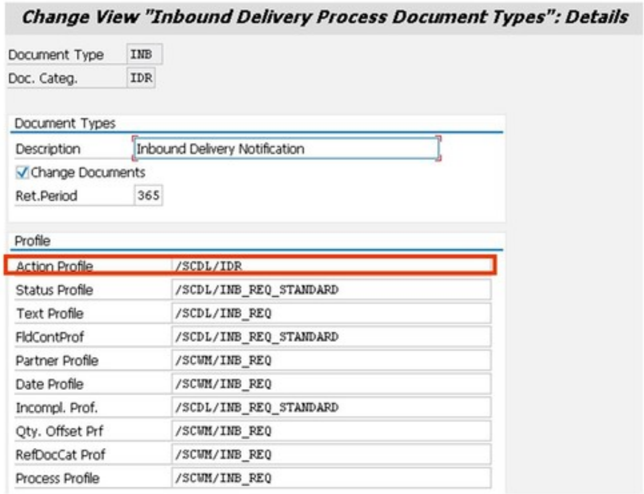

Display View "Processing Types": Overview
Dialog Structure
Action Profile
Action Definition
Processing Types
Permitted Processing Types of Action
Assignment/Change Using Value Help in List
Default
Set Processing
Document
FaxCoverSht
Archiving

Action Definition: /SCWM/PRD_IN_UNLOAD_LIST_PRINT
Description: Print Unloading Instruction for Inbound Delivery
External Communication ☐
Smart Forms Print ☑
Form Name: /SCWM/LOAD_INSTR
Form Type: PDF-Based Forms
Format: /SCWM/LOAD_INSTR_PDF
Personalization Type: Recipient-Specific Variable Replacement

Figure 120: Processing Type – Smart Form

Assignment to Delivery Document

Once you define the action profile, assign it to the document type.



Change View "Inbound Delivery Process Document Types": Details

Document Type INB
Doc. Categ. IDR

Document Types
Description Inbound Delivery Notification
☑ Change Documents
Ret.Period 365

Profile

Action Profile	/SCDL/IDR
Status Profile	/SCDL/INB_REQ_STANDARD
Text Profile	/SCDL/INB_REQ
FldContProf	/SCDL/INB_REQ_STANDARD
Partner Profile	/SCWM/INB_REQ
Date Profile	/SCWM/INB_REQ
Incompl. Prof.	/SCDL/INB_REQ_STANDARD
Qty. Offset Prf	/SCWM/INB_REQ
RefDocCat Prof	/SCWM/INB_REQ
Process Profile	/SCWM/INB_REQ

Figure 121: Delivery Document Type Definition

In the PPF, there are *Schedule Conditions* and *Start Conditions*. Delivery processing only uses the schedule conditions to determine when an action is scheduled.

Condition Definition

You define the conditions in customizing for *SCM Extended Warehouse Management* in *Extended Warehouse Management* → *Cross-Process Settings* → *Delivery Processing* → *Actions* → *Change Actions and Conditions* → *Define Conditions*. In here you process the actions that you created in *Define Action Profiles and Actions* in customizing, and set the following properties:

- Define the schedule condition and the start condition for each action definition as transportable conditions. For example, you define an action to send delivery data for a due billing document with the schedule conditions: *billing document relevant* and *status change to goods issue posted*.
- You state whether or not the action is automatically scheduled, if the schedule condition is satisfied.

Defining Schedule, Start, and Processing Conditions

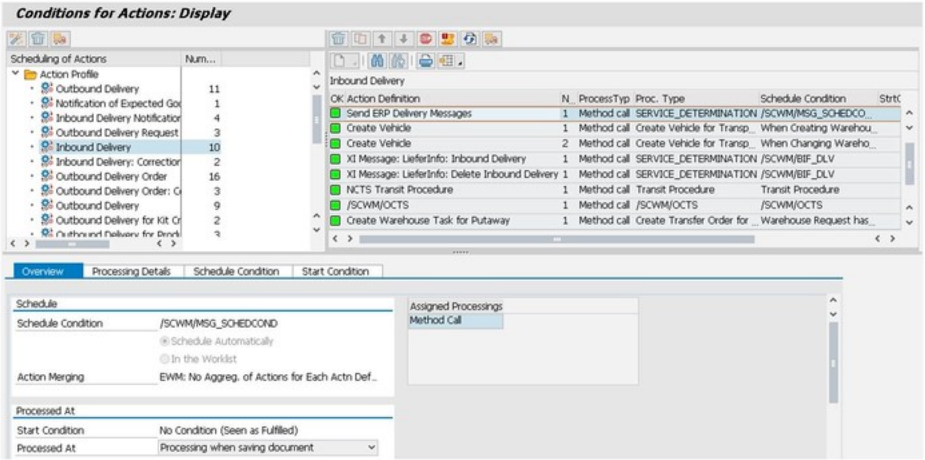
The step-by-step procedures for defining schedule, start, and processing conditions, are as follows:

1. Choose the action profile you wish to process by double-clicking on it in the left-hand area of the screen. The actions assigned to the profile appear in the upper right-hand area of the screen. Using the *Create* button, you can choose already-defined actions from the action profile and add them to the list. You can add an action several times.
2. Choose the desired action by double-clicking and choosing the *Display/Change* button. The tab pages for defining processing, scheduling, and start conditions appear in the lower area of the screen.
    - The settings for the action in the action profile automatically appear on the *Overview* tab page if the *Presetting from Action Definition* field is selected. If you deselect the

field, you can change the default values. If you want the action to be scheduled automatically if the schedule condition is satisfied, select the *Schedule Automatically* field. This tab page also shows whether you have assigned schedule or start conditions.

- On the *Processing Details* tab page, you can display details of the *Assigned Processings*. In the case of the processing type **`Method Call`**, you can change the processing parameters.
- On the *Schedule Condition* and *Start Condition* tab pages, you can create conditions for each action definition.

  Enter a name for the condition and invoke the condition editor by double-clicking. You can use the condition editor to create your own conditions.



Scheduling of Actions	Num...
Action Profile	
Outbound Delivery	11
Notification of Expected Go	1
Inbound Delivery Notificatior	4
Outbound Delivery Request	3
Inbound Delivery	10
Inbound Delivery: Correctior	2
Outbound Delivery Order	16
Outbound Delivery Order: C	3
Outbound Delivery	9
Outbound Delivery for Kit Cr	2

Inbound Delivery

OK	Action Definition	N...	ProcessTyp	Proc. Type	Schedule Condition	StrtC
🟩	Send ERP Delivery Messages	1	Method call	SERVICE_DETERMINATION	/SCWM/MSG_SCHEDCO...	
🟩	Create Vehicle	1	Method call	Create Vehicle for Transp...	When Creating Warehou...	
🟩	Create Vehicle	2	Method call	Create Vehicle for Transp...	When Changing Wareho...	
🟩	XI Message: LieferInfo: Inbound Delivery	1	Method call	SERVICE_DETERMINATION	/SCWM/BIF_DLV	
🟩	XI Message: LieferInfo: Delete Inbound Delivery	1	Method call	SERVICE_DETERMINATION	/SCWM/BIF_DLV	
🟩	NCTS Transit Procedure	1	Method call	Transit Procedure	Transit Procedure	
🟩	/SCWM/OCTS	1	Method call	/SCWM/OCTS	/SCWM/OCTS	
🟩	Create Warehouse Task for Putaway	1	Method call	Create Transfer Order for ...	Warehouse Request has...	

Schedule

Schedule Condition: /SCWM/MSG_SCHEDCOND
● Schedule Automatically
○ In the Worklist
Action Merging: EWM: No Aggreg. of Actions for Each Actn Def...

Processed At

Start Condition: No Condition (Seen as Fulfilled)
Processed At: Processing when saving document

Assigned Processings
Method Call

Figure 122: Condition Definition

PPF Action Scheduling

The following are the main features of PPF action scheduling:

- You can configure scheduling of PPF actions, perform customizing in the sequence specified under *Prerequisites* in customizing for *SCM Extended Warehouse Management* under *Extended Warehouse Management → Cross-Process Settings → Delivery Processing → Actions → Configure Action Scheduling.*
- If you want to view or edit schedule conditions for PPF actions, in customizing for *SCM Extended Warehouse Management*, choose *Extended Warehouse Management → Cross-Process Settings → Delivery Processing → Actions → Change Actions and Conditions → Define Conditions.*
- If you want to edit condition records for the schedule condition of a PPF action, on the EWM *Index* screen, choose *Extended Warehouse Management → Delivery Processing → Actions → Maintain Condition Records for PPF Schedule Conditions.*
- If you want to view and edit PPF actions, on the EWM *Index* screen, choose *Extended Warehouse Management → Delivery Processing → Actions → Process and Display PPF Action.*

Document Printing in PPF

Documents related to warehouse orders and handling units are printed using PPF actions. The PPF application is the same for warehouse orders and handling units, but with different PPF action profiles.

Table 10: Action Profile for S&R Objects

Application Object	PPF Application	Action Profile
Warehouse Order	**`/SCWM/WME`**	**`/SCWM/WO`**
Handling Unit	**`/SCWM/WME`**	**`/SCWM/HU`**

Action Profiles

You can find the standard action profiles for WO printing in Customizing for *SCM Extended Warehouse Management* under *Extended Warehouse Management → Cross-Process Settings → Warehouse Order → Print → Define PPF Action Profiles*.

You can find the standard action profiles for HU printing in Customizing for *SCM Extended Warehouse Management* under *Extended Warehouse Management → Cross-Process Settings → Handling Units → Basics → Print → Define PPF Action Profiles*.

You can also find the standard PPF action definitions assigned, by following the paths above, and selecting the action profile in the table. By default, all action definitions are active and have PPF conditions assigned. Therefore all of the action definitions will be evaluated in a standard system. If you do not need all of them, you can set them to inactive. By default, all action definitions have the processing type 'Method Call' only. They don't use the existing processing type 'Smart Forms Print' for printing of Smart Forms or 'External Communication'.

> Note:
> The name of the action definition has no direct relationship to the actual printed form.

PPF Conditions

You can find the standard PPF conditions for WO printing in Customizing for *Extended Warehouse Management* under *Cross-Process Settings → Warehouse Order → Print → Define PPF Action Conditions*.

You can find the standard action profiles for HU printing in Customizing for *Extended Warehouse Management* under *Cross-Process Settings → Handling Units → Basics → Print → Define PPF Action Conditions*.

By default, some of the PPF action definitions have two PPF conditions. They differ in the way they are scheduled, as follows:

- A PPF condition with a schedule condition and with the Schedule Automatically checkbox selected is used for automatic printing triggered by a process like WO creation.
- A PPF condition without a schedule condition and with the *In the Worklist* checkbox selected is used for the reprint dialog in the monitor. It allows you to trigger a PPF action at any time without checking the standard schedule condition. If you do not want to allow this in your system, you can delete this PPF condition.

Schedule Condition

The schedule condition is the most important part, because inside the schedule condition, it is decided not only if a PPF action should be scheduled (if a condition record is found), but also which form (field *FORMU*), type of form – Smart Form or Adobe PDF – (field *RFID*), printer (field *LDEST*), and spool parameter (field *SPOOL*) should be used.

All schedule conditions for WO printing call function module **`/SCWM/SCHEDULE_COND_WO`** and all schedule conditions for HU printing call function module **`/SCWM/SCHEDULE_COND_HU`**.

Inside the schedule condition, the SAP condition technique is called with application data from the context class of the action profile. A PPF action is scheduled if a condition record is found with the PPF action name (field **`PPFACTDEF`**) as the returning value.

> Note:
> If no condition records are maintained, no PPF action is scheduled. Setting up the SAP condition technique is a prerequisite for WO and HU printing. The setup is done in Customizing for *SCM Extended Warehouse Management* under *Extended Warehouse Management* → *Cross-Process Settings* → *Handling Units* → *Basics* → *Print or Cross-Process Settings* → *Warehouse Order* → *Print*. You maintain the condition record in the SAP *Index* screen under *Extended Warehouse Management* → *Work Scheduling* → *Print* → *Settings* → *Create Condition Records for Printing*.

To Print a Document in PPF

1. Display the action profile to print a HU label in Customizing for EWM, by choosing *SCM Extended Warehouse Management* → *Extended Warehouse Management* → *Cross-Process Settings* → *Handling Units* → *Basics* → *Print* → *Define PPF Action Profile*, and choosing the action profile */SCWM/HU*.
2. Open the *Action Definitions* folder.
3. Open the action definition *HU_LABEL* (*Print HU label*) to set the *Processed At* field.
4. Open the *Processing Types* folder to see the processing type, *Method Call*. In the lower portion of the screen you will see the name of the method call: */SCWM/HULABEL*. It is a method call because the form is specified in the condition record.
5. Display the PPF Conditions in Customizing for EWM, by choosing *SCM Extended Warehouse Management* → *Extended Warehouse Management* → *Cross-Process Settings* → *Handling Units* → *Basics* → *Print* → *Define PPF Action Conditions*.
6. Open the *Print Handling Unit* action profile.
7. For the action definition, *Print HU Label* with process type */SCWM/HULABEL*, you can set the schedule condition field in the *Schedule Condition* tab.

> Note:
> The schedule condition is important. It determines whether or not a PPF action should be scheduled (if a condition record is found) and which form (*FORMU* field), type of form (Smart Form or Adobe PDF — *RFID* field), printer (*LDEST* field), and spool parameter (*SPOOL* field) should be used. The schedule condition also determines the determination procedure for the condition records.

8. Create condition records for printing HU labels from the EWM *Index* screen, by choosing *Extended Warehouse Management* → *Work Scheduling* → *Print* → *Settings* → *Create Condition Records for Printing (HUs)* .

> Note:
> An SAP Smart Form is available for each action definition. The system only supports printing of Smart Forms. The SAP Smart Form for printing HU labels is */SCWM/HU_Label*. You specify the assignment between action definition and Smart Form in the created condition records. The condition record will also determine the printer and the spool parameters.

LESSON SUMMARY

You should now be able to:

- Apply the PPF in delivery processing